

# ***High-Speed DATA/FAX Modem***

***Domestic and International versions***

***Data/Fax Internal and External versions***

***Data/Fax/Voice/Speakerphone  
Internal and External versions***

***Reference Guide***





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## Before You Begin your Installation

The product you have purchased is designed to be easily installed into most IBM PC or compatible systems. Many products have large, easy-to-read legends to allow for the easy configuring of the product. This installation manual contains detailed instructions. Most included software has automatic installation programs to place the software correctly onto your computer. However, as all computers are configured differently, you may be required to perform some basic MS-DOS or Windows tasks. If you are not familiar with basic MS-DOS commands such as DIR, CD, or EDIT, you should check your MS-DOS manual, or seek assistance from your local computer dealer to install the product.



### *How to get Technical Assistance*

The dealer that you purchased this product or your computer from is the first place you should go for technical assistance. The dealer is usually the most qualified source of help, and is most familiar with your system and how this product should be installed. Many dealers have customer service and technical support programs, with varying levels of support



offered, depending on your needs and computer knowledge. **Please contact the dealer first whenever a problem occurs. International customers will find that contacting the place of purchase for assistance will be much more efficient than contacting Boca Research directly.**

### *If your Dealer Can't Assist you*

If you can't get assistance from your dealer, the manufacturer provides varying levels of technical assistance as summarized on the following page. **All phone numbers are based in the United States.**

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**Boca BBS**  
**561-241-1601**



**Standard Free**  
**Technical Support**  
**561-241-8088**



**Automated**  
**Fax Retrieval**  
**System**  
**561-995-9456**



**Priority Service**  
**900-555-4900**  
**(\$2 per minute)**



**Technical**  
**Support Fax**  
**561-997-2163**

The Standard Free Technical Support number is for quick answers to specific inquiries on product features and technical questions (call **561-241-8088**; M-F, 8 am to 6:30 pm EST). Direct access to technical support representatives is provided on a limited basis. If you require immediate attention or in-depth help with the installation of the product, please call our 900-priority support number for service. This number gives you immediate access to senior-level technicians. The number is **900-555-4900**. You will be charged \$2.00 per minute. The charges will appear on your next phone bill.

**On-Line Support!**  
**CompuServe: GO BOCA**  
**Internet:**  
**email:**  
**support@bocaresearch.com**  
**on the World-wide WEB:**  
**http://www.bocaresearch.com**



## **Damaged or Missing Items**

We use many world-class quality assurance programs to ensure the product you purchased is of the highest caliber. Sometimes, however, a component may be missing from the box, or is damaged or corrupt in some way. If this happens, immediately return the entire package to your place of purchase so you may exchange it for a new one. Your dealer should be able to provide you with an exchange far more quickly than by contacting us directly. If for some reason you are unable to return the product directly to its place of purchase, refer to the “Servicing Your Product” and “Warranty” sections in this manual for instructions.

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## Using this manual...

This manual provides installation and operating instructions for your modem. The manual assumes the user has basic computer skills and is familiar with personal computers. Its primary purpose is to provide physical installation instructions and basic troubleshooting. All sections should be read carefully before beginning any installation procedures. Customer support experience has shown that many costly and time-consuming calls to technical support staff can be avoided with closer attention to the information provided here. **In addition to following the instructions provided in this manual, you will also need to consult the documentation supplied with your communications software.**

## IMPORTANT NOTICE

### FCC Requirements

The Federal Communications Commission (FCC) restricts the way you can use modems. Read the FCC compliance statement found in Appendix B of this manual.

### Connecting the Modem

You can connect the modem to various types of telephone jacks. The acceptable phone jack types are RJ-11, RJ-12, RJ-13, RJ-41S, and RJ-45S. Most homes and businesses use one of these jacks. If your phone system does not have a modular jack, you can purchase an adapter to convert your jack into an RJ-11C jack. Adapters may be purchased from any local phone or electronics store.

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## HOW THIS MANUAL IS ORGANIZED

**Quick Start.** If you are familiar with modem operations, this abbreviated procedure provides a short cut for connecting your modem. Otherwise, read Section Two or Three before continuing.

**Section One: Introduction.** An overview of the features of your modem.

**Section Two (Internal) and Section Three (External): Installation.** This section provides physical installation instructions (including how to connect the phone line), and procedures for testing the connection. Sections for Windows 95, Windows NT, and Windows 3.x/MS-DOS users are also included.

**Section Four: Troubleshooting.** This section provides a description of the most common problems which may be encountered during installation and operation along with possible solutions.

**Appendices.** These include technical specifications, FCC and DOC (Canada) compliance information as well as other regulatory statements, an AT command reference, and information on obtaining service, as well as your warranty.

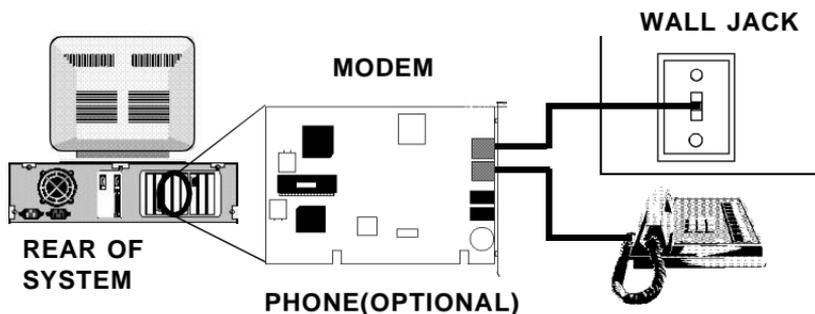
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## Quick Start!

**NOTE: International versions of this product will vary with respect to physical configuration.**

### **FOR THE INTERNAL MODEL**

If you are familiar with personal computers and modems, you may follow the diagram below to quickly connect the modem to your system. Make all necessary connections as shown below.



**(Phone cable configuration will vary for international settings. European modems do not have the phone jack.)**

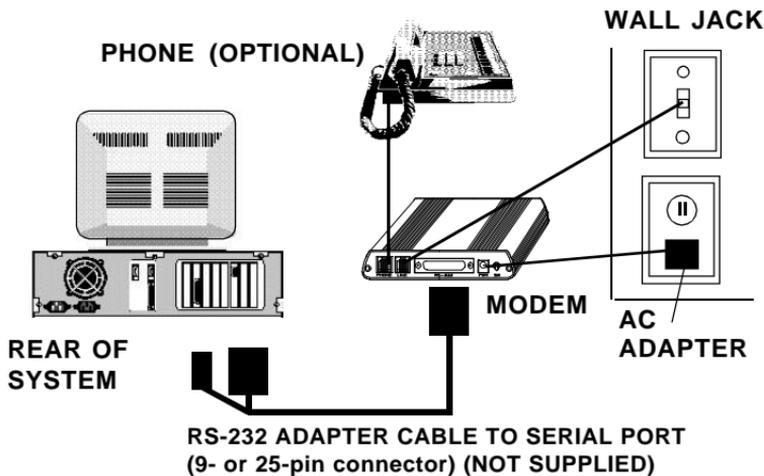
After you have installed your modem and made the necessary connections, verify line connection by lifting the receiver of the telephone connected to the modem to check for a dial tone. After hearing the tone, hang up (U.S. models only), and power on your computer. International customers should refer to section 2.5. If you are connecting a speakerphone, see page 10, otherwise, continue with page 11 and follow the appropriate instructions based on your operating system.

# Quick Start!

**NOTE: International versions of this product will vary with respect to physical configuration.**

## FOR THE EXTERNAL MODEL

If you are familiar with personal computers and modems, you may follow the diagram below to quickly connect the modem to your system. Make all necessary connections as shown below.

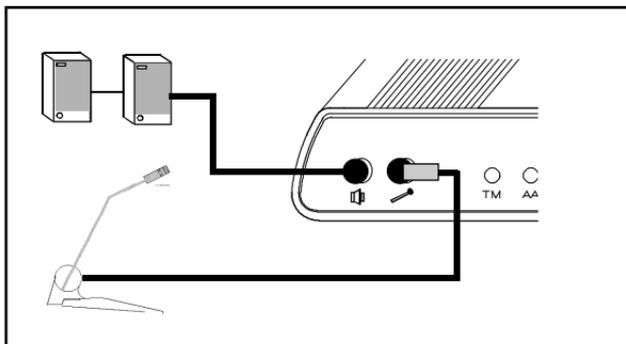
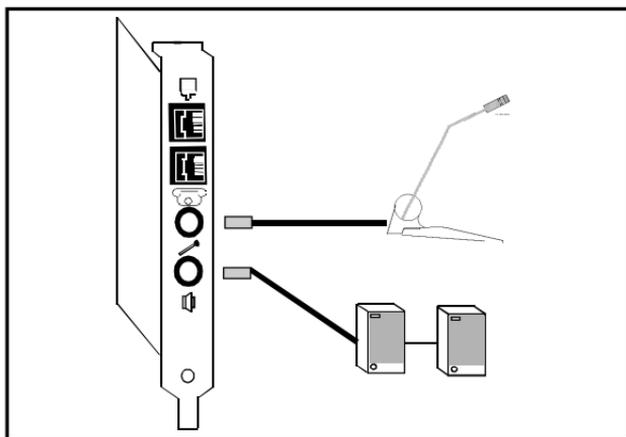


**(Phone cable configuration will vary for international settings. European modems do not have the phone jack.)**

After you have installed your modem and made the necessary connections, verify line connection by lifting your telephone receiver to check for a dial tone. After hearing the tone, hang up (U.S. models only), power on your computer, and load your communications software. International customers should refer to section 3.5. If you are connecting a speakerphone, see page 10, otherwise, continue with page 11 and follow the appropriate instructions based on your operating system.

## SPEAKERPHONE OPTION

**You may connect a microphone and speakers to the microphone and speaker jacks, respectively, if supported by your modem. The microphone and speakers allow you hands-free speakerphone operation. Check the instructions which came with your microphone and speaker for proper connection to the microphone and speaker jacks.**



**If you are running Windows 95**, the modem should be recognized at power-up.

Windows 95 will detect new hardware and display the “**New Hardware Found**” box. Select “**Driver from disk provided by hardware manufacturer**”. An “**Install from Disk**” box is then displayed. If you received the Boca MegaMedia CD, insert it in your CD-ROM drive, and type D:\DRIVERS. Select OK. If your CD-ROM drive is other than D:\, substitute the appropriate drive letter.

**OR**, if you received a Driver and Utilities diskette, insert it in your diskette drive, and type A:\ (or B:\). Select OK. Windows 95 will complete the installation. You may be asked for your original Windows 95 installation diskettes or CD.

**For more detail see pages: Internal: 23-27/External: 39-41**

**If you are running Windows 3.x/MS-DOS**, follow the directions below:

**Make sure you exit to DOS first if you are running Windows.**

If you received the Boca MegaMedia CD, insert it in your CD-ROM drive. Change to the D:\DRIVERS directory on the CD-ROM by typing D: and pressing ENTER, then typing cd\drivers. If your CD-ROM drive is other than D:\, substitute the appropriate drive letter then type INSTALL and press ENTER.

**OR**, if you received a Driver and Utilities diskette, insert it in you diskette drive, type A:\INSTALL (or B:\INSTALL) and press ENTER.

**For more detail, see pages: Internal: 28-29/External: 42**

After following the appropriate instructions to complete installation, you may load your communications software.

## Now What?

Once your application software is installed, you will be able to send and receive data as well as faxes, send and receive voice messages (with speakerphone option), and play interactive games. We recommend that you familiarize yourself thoroughly with the application software documentation.

If you require more details than provided in the *Quick Start*, proceed to Section Two or Three. For details on installing and running the various included applications, refer to the appropriate documentation. For an overview of the modem's features, refer to Section One.

If you will be operating from terminal mode with your data communications software (using standard and enhanced AT commands and S-Registers), refer to the *Modem Command Reference* in Appendix C. There are also many references available on the market.

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## Section One: Introduction

Congratulations on your purchase of a Boca High-Speed Modem. Boca Modems are easy to install as long as you follow the provided instructions and safety precautions. If you require more information than found in the *EZ Installation Guide*, consult this manual. Always read through all procedures before you begin installation. It is also a good idea to refer to your computer system manual to assure correct and safe installation.

Your new modem combines high-speed data and fax capability for the Microsoft Windows 95, Windows 3.1, Windows for Workgroups 3.11, Windows NT, and DOS environments. The modem supports the V.34 protocol, as well as V.32bis which provides high-speed data transmission with V.42bis/MNP5 (data compression) and V.42/MNP2-4 (error control). For additional information on features, supported protocols, and technical specifications, see Appendix A.

**CAUTION: Electronic components are sensitive to static electricity. To prevent damage, discharge any static electricity from your body by touching a known grounded metal surface, such as your computer's chassis before and during installation of the component. To prevent damage to your new Boca modem, avoid contact with any circuitry and only handle the modem by its edges.**

## Minimum System Requirements

- IBM-compatible 486DX/33 or greater system
- One available 16-bit ISA expansion slot
- Windows 95 or Windows 3.x and MS-DOS 6.2 or higher
- 8MB system RAM
- Free hard disk space needed (will vary based on included options/extras)
- 3.5-inch diskette drive or CD-ROM drive

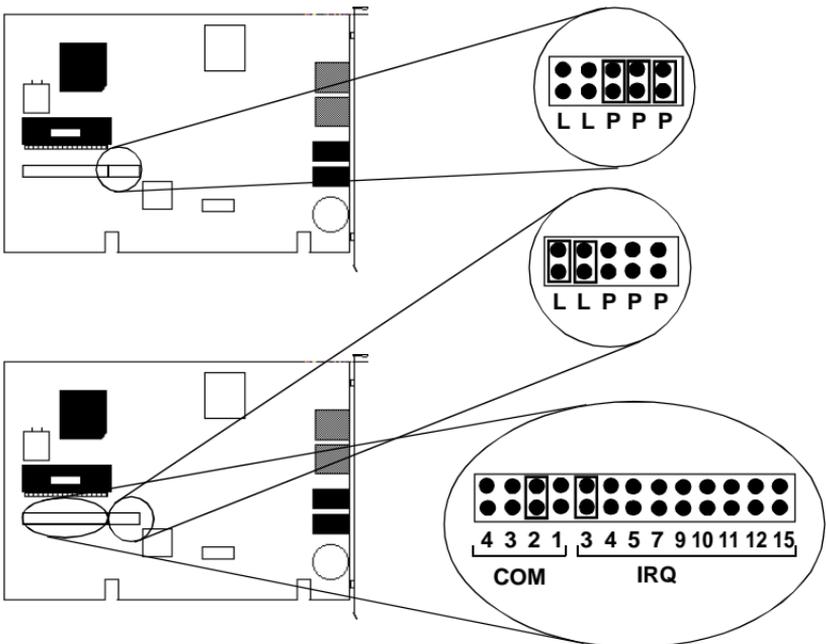
## A Word About “Plug and Play”

The “Plug and Play” BIOS on your computer’s system board (motherboard) identifies all system components (and the resources they use). The Windows 95 operating system is fully compliant with the Plug and Play standard and will recognize all devices. Plug and Play, for example, eliminates the need of configuring devices through setting jumpers on an add-in circuit board such as an internal modem. Hardware-based Plug and Play (computer system BIOS) or software-based Plug and Play (e.g., Windows 95) will recognize any new devices installed in your computer and assign resources accordingly.

## Configuring your Modem for Plug and Play or Non Plug and Play Mode

Your modem may come with the option of selecting Plug-and-Play mode or non Plug-and-Play mode (also referred to as “Legacy” mode, intended for older computers). This choice is accomplished by setting jumpers on the board. Plug-and-Play mode allows the system BIOS in newer computers to assign COM ports and IRQ addresses. **Warning: Disabling Plug and Play mode could result in the modem not operating properly.** You should determine which mode is supported by your computer.

In “Legacy” mode, setting COM ports and IRQ addresses is done manually with jumpers. The modem’s factory default is set to Plug-and-Play mode. Refer to the diagram as shown below.



**NOTE: COM2/IRQ3 is suggested here as an example. COM1 has likely been assigned to another device in your system, such as a mouse.**

## Voice Capabilities (speakerphone model)

The speakerphone model features automatic call recognition, auto-answer, and an embedded voice modem 'AT' command set. The modem, along with its host computer, support answering machine functions through voice and fax communications software. You can set up multiple mailboxes. The automated attendant feature allows dial-in users to skip between mailboxes, then check, answer, and leave messages. It also supports microphone and speaker automatic gain control, as well as headset.

## Fax Capabilities

The modem offers a wide range of fax services. It supports Group 3, class 1 fax send and receive operations. It complies with ITU-TSS (formerly CCITT) V.33, V.17, V.29, V.27ter, and V.21 channel 2 international fax standards. It also implements the EIA T-30 protocol, and Class 1, Group 3.

## Data Capabilities

The modem offers the widest possible range of internationally accepted standard modulation methods and protocols. It provides data throughput up to 115.2Kbps. The modem complies with ITU-TSS standards V.34, V.32bis, V.32, V.23, V.22bis, V.22A/B, and V.21, as well as Bell 212A and 103. (K56 Flex for models supporting 56Kbps). The modem implements V.42 error control with LAP-M and MNP 2-4, as well as data compression with V.42bis and MNP-5.

## Ideal for Travelers

Voice features allow for remote call-in with full services to answer, route, delete, or forward messages. For example, while you are traveling, faxes are stored on your hard drive. When you call in to review a voice message, a fax forwarding function allows received faxes to be forwarded to another fax number at any location.

## VoiceView® Support

Your modem may support VoiceView. This standard allows the transmission of computer data to be introduced during a normal phone call. It alternates between voice and data—once the data goes through, you automatically switch back to your voice conversation.

## A Word about Simultaneous Voice and Data (SVD)

Your modem may support SVD. Simultaneous Voice and Data (SVD) is a standard allowing the simultaneous transmission of voice and data over a single telephone line. The model supporting this standard will allow you to make ordinary phone calls to other PC users while sharing modem applications over a standard telephone line. When a phone call is in SVD mode, any data (e.g., images, 3D-graphics, shared applications, interactive games) can be shared with a normal phone conversation over the same analog line.

***IMPORTANT: When you use the modem in SVD mode, you need to add the following command to your initialization string***

`AT-SMS=2#VLS=6`

Note that while the modem is in SVD mode, full-duplex speakerphone reverts to half-duplex functionality.

## Optional Accessories (speakerphone models with microphone and speaker jacks)

The speakerphone version of the modem is equipped with microphone and speaker jacks for use with headset, speakers and microphone. **(See installation instructions: INTERNAL: p. 21-22; EXTERNAL: p. 37-38).** The handset can be used to record outbound messages. However, a microphone is recommended for better quality recordings. You may use a combination headphone and microphone or a separate microphone and speaker(s).

### Microphone Requirements:

The microphone element must be of the electret type also known (incorrectly) as a condenser type. The microphone in most telephone handsets is of this type. This modem was designed for a microphone sensitivity of -64 dBspl. Other microphone sensitivities work equally well, with only a subjective difference in loudness. Carbon microphone elements will also work, but don't offer the quality of the electret. Another common microphone element is the dynamic type which will NOT work with this modem.

### Speaker Requirements:

You can attach the modem to a high-quality amplified external speaker or the earpiece of a handset. The external speaker must have an impedance rating of 8 ohms or more.

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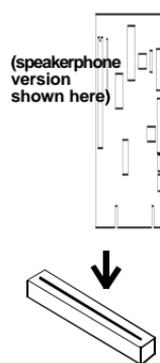
## Section Two: Installation (Internal)

This section explains how to install the internal modem in your computer. Review the contents of your package to make sure all items are present. **If any items are missing or damaged, contact the dealer from whom you purchased the modem for assistance. Also note that phone cable configuration will vary for international settings. The diagrams which follow depict the speakerphone version of the modem.**

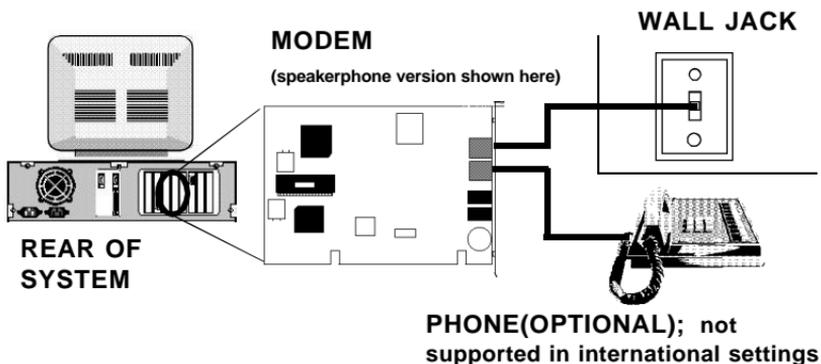
### 2.1 Installing the Modem

*NOTE: If your computer came with an internal modem, you must physically remove it or disable it through your computer's BIOS setup. Consult your computer's manual or manufacturer for specific instructions.*

1. Turn off your computer and disconnect any attached devices and power cords. Remove any diskettes.
2. Remove the computer's cover and locate an available 16-bit expansion slot. Remove that expansion slot cover and save the screw.
3. Remove the modem from its anti-static bag, handling it by its edges and retaining bracket. Be careful not to touch the edge connector or any components on the card.
4. Carefully insert the modem into the expansion slot you selected, applying pressure to the upper board edge until it is seated in the slot.



- Secure the modem into place by aligning its metal retaining bracket with the hole in the top edge of the system's rear panel. Fasten the modem's metal bracket with the screw removed from step 2.
- Disconnect your present phone cord from the wall jack. Plug one end of the phone cord that came with the modem into the wall jack, and the other end into the jack either labeled **LINE** or marked with the symbol (☐) on the back of the modem. Plug the phone into the jack either labeled **PHONE** or marked with the symbol (☎) on the back of the modem (not supported in international settings). See illustration below. *Note: A telephone is not necessary for the proper operation of this product.*



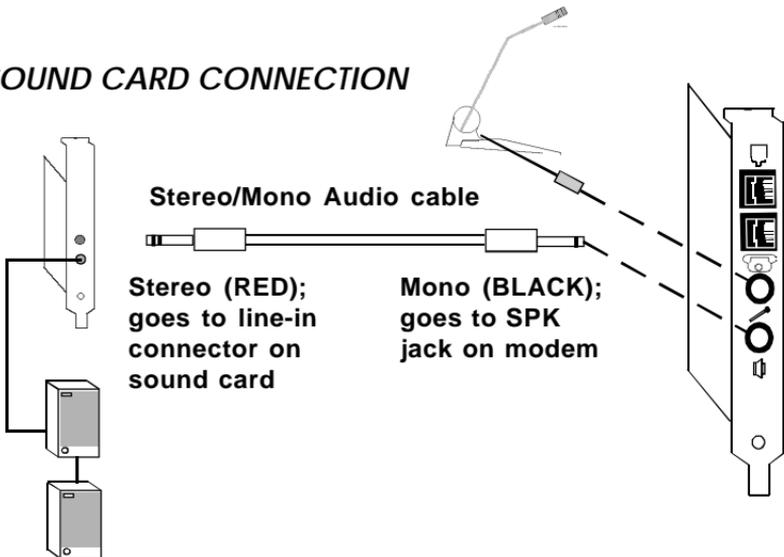
- Replace the system cover and reconnect any detached devices and power cords. Now, you may use your stereo/mono cable to attach to other devices (if supported by your modem) as explained in step 8 on the next page, or power up your computer. **If you are running Windows 95**, the modem should be recognized at power-up. **If you are running Windows 3.x/MS-DOS**, go on to **Modem Setup** on pages 28-29.

8. Connect devices to microphone and speaker jacks.

**a. If you have an existing sound card, continue below. If you do NOT have a sound card, skip to step b.**

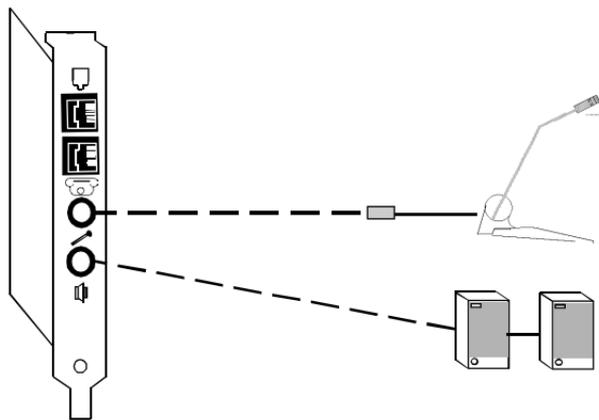
- Attach a microphone to the jack labelled **MIC** or marked with the symbol (  ) (to record outgoing messages; in addition, the microphone serves as a transmitter for your speakerphone) on the modem.
- Attach the mono-end of a stereo-mono cable to the jack labelled **SPK** or marked (  ) on the modem (to listen to phone messages through your sound board). E.g., playback, call monitoring.
- Attach the stereo-end of a stereo-mono cable to the line-in connector on your sound card. If your sound card does not have a line-in connector, you will need to attach a speaker(s) to the speaker jack, labelled **SPK** or marked with the symbol (  ) on the modem.

### SOUND CARD CONNECTION



**b. If you do NOT have an existing sound card:**

- Connect a microphone to the jack labelled **MIC** or marked with the symbol (  ) on the modem (to record outgoing messages; in addition, the microphone serves as a transmitter for your speakerphone).
- Connect a speaker(s) to the jack labelled **SPK** or marked with the symbol (  ) (to listen to incoming messages; in addition, the speaker serves as a receiver for your speakerphone) on the modem.

**MICROPHONE AND SPEAKER CONNECTION**

Line connection is complete. Power up your computer. **If you have Windows 95**, the modem should be recognized at power-up. **If you have Windows 3.x/MS-DOS**, continue with Modem Setup on pages 28-29.

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## 2.2 Modem Setup for Windows 95 Users

### Plug and Play Installation

**Please check the version of Windows 95 that you are using. Right click on the “My Computer” icon on the desktop and select “Properties”. Under “System”, if your version reads 4.00.950 B, then you have OEM Service Release 2 of Windows 95. In this case, follow the instructions immediately below. Otherwise, continue with the next page.**

1. When Windows 95 detects new hardware, it starts the “**Update Device Driver Wizard**”.
  - a. **If you received an installation CD**, insert the CD and click **Next**.
  - b. **If you received an installation diskette**, insert the diskette and click **Next**.
2. Complete the installation by clicking on the the **Finish** button.

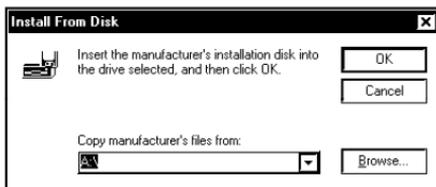
**NOTE: After Windows 95 finishes copying files, it may detect another device called Voice Modem Serial Wave Device (depending on the modem you have. Simply follow the same instructions as for the modem installation above.** Congratulations! Setup is complete for Windows 95 users. Continue with *2.5 Testing the Connection*.

If you need to re-configure the board, click on **Control Panel**, then **System**, then **Device Manager**. The device description is under the section, **Modem**. See your Windows 95 documentation on changing properties of devices using the **Device Manager**. Congratulations! Setup is complete for Windows 95 users. Continue with *2.5 Testing the Connection*.

## Earlier Versions of Windows 95

1. When the board is physically installed, start Windows 95 as you normally would.
2. When Windows 95 detects new hardware, it displays the **New Hardware Found** dialog box. Here, you are asked what driver files are associated with the new hardware.
3. From the choices given, select **Driver from disk provided by hardware manufacturer**.

4. Windows 95 then displays the “**Install from Disk**” dialog box. Here, you are asked for the location of the driver files.



- a. **If you received an installation CD**, select **Have Disk**. Then:
  1. Insert the CD
  2. Type the path for the location of the drivers (D:\DRIVERS).
- b. **If you received an installation diskette**, select **Have Disk**. Then:
  1. Insert the diskette.
  2. Type the path for the location of the drivers (A:\ or B:\).

If you need to re-configure the board, click on **Control Panel**, then **System**, then **Device Manager**. The device description is under the section, **Modem**. See your Windows 95 documentation on changing properties of devices using the **Device Manager**. Congratulations! Setup is complete for Windows 95 users. Continue with *2.5 Testing the Connection*.

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## Non-Plug and Play Installation

1. Select **Start... Control Panel... Add New Hardware...**
2. Continue selecting **Next...** to allow Windows 95 to detect the new hardware in your system and check Yes after hardware detection.
3. Select **Details...** Then select **Communications Port...** Windows 95 should have found a communications port. If not, verify the modem has been physically installed with no conflicts.

**NOTE: If you need to reconfigure the board, re-select Control Panel... System... Device Manager. Refer to your Windows 95 documentation on changing properties of devices using the Device Manager.**

4. Select **Finish.**
5. Return to the **Control Panel...**

Select **Modems...if there are no modems installed in your computer**, and go to step 6.

**If there is a modem installed**, a Modem Properties screen is displayed. Select **Add...**

6. Make sure the following option is checked: "Don't Detect my modem; I will select it from a list".
7. Highlight and select the modem which corresponds to the one you purchased, then **Next**
8. Select the COM port setting chosen in step 3 above. Then select **Next...**These settings must match.
9. Select **Finish.**

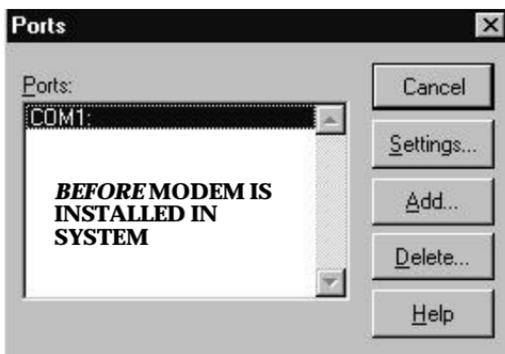
## 2.3 Modem Setup for Windows NT Users

**NOTE: Determine if your modem has jumpers. See page 15.**

**If YES, set the jumpers to Plug and Play (Plug and Play system required) OR "Legacy" mode (any system).**

**If NO, you must have a Plug and Play system for the modem to work with**

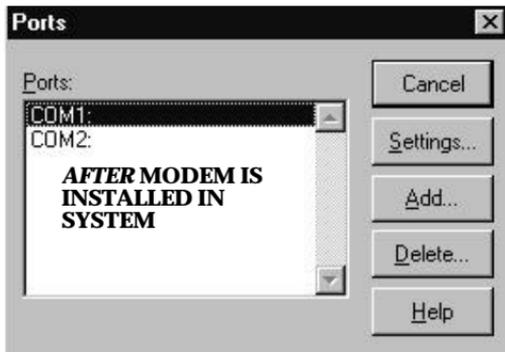
**Windows NT. Windows NT installs your modem as a COM port.**



To determine your available COM ports, follow these steps:

1. Click on **Control Panel** and then **Ports**. Note the assigned COM ports.
2. Select **Cancel**, then shut down the computer.
3. Install the modem.
4. Restart Windows NT
5. Select **Start, Settings, Control Panel**, then **Ports**.

Note the additional COM port assigned to the modem. Continue with the next page.



**Example:** Prior to installing the modem, you have COM1; after installing the modem you should see the new port to which the modem was assigned (COM2 in the example on the previous page).

**If no additional COM ports are displayed, make sure your system has a Plug and Play BIOS. If yes, please contact your dealer for assistance.** Select **Cancel** to exit the Ports dialog box.

6. Double-click on the **Modems** icon.
7. At the **Install New Modem** screen, check the box in front of **“Don’t Detect my Modem; I Will Select it from a List”**.
8. Select **Next**, then **Have Disk**. Insert the Modem Drivers Installation Disk into your diskette drive.
9. Type A:\, then click **OK**.
10. Highlight and select the modem which corresponds to the one you purchased, then **Next**.
11. Select the COM port to which the modem was assigned. Then select **Next**, then **Finish**. Congratulations! Setup is complete for Windows NT.

The modem is now ready to be tested and operated. Continue with *2.5 Testing the Connection*.

## 2.4 Modem Setup for Windows 3.x or MS-DOS Users

**Make sure you exit to DOS first if you are running Windows.**

With the Driver diskette in your floppy drive, type **A:INSTALL** (or **B:INSTALL**); or the installation CD in your CD-ROM drive, type **D:**, press ENTER then type **CD\DRIVERS**. Lastly, type **INSTALL** and press ENTER. Install copies files to your hard drive and modifies your CONFIG.SYS and startup files. When Install is finished, it will restart your computer. If your computer boots into Windows, exit to DOS. The install utility will determine if your system is Plug and Play or non-Plug and Play. Follow the instructions below:

***IF INSTALL DETECTED A PLUG AND PLAY SYSTEM, follow the instructions in this box. Otherwise, continue below***

At the DOS prompt (C:\>), go to the **MODEM** directory by typing **cd\modem**. Type **LOCATE** and press ENTER to determine the COM port and IRQ to which the modem was assigned by the Plug and Play BIOS. Write this information down.

***IF INSTALL DETECTED A NON-PLUG AND PLAY SYSTEM, follow these instructions:***

At the DOS prompt (C:\>), go to the **MODEM** directory by typing **cd\modem**. Type **SETMODEM** and press ENTER. This will configure the modem's COM port and IRQ. Write this information down. Press F10 to save, then turn off your computer and continue with the next page. Also see next page for more information on SETMODEM.

## Running the SETMODEM Utility

```
Modem Setup Utility
Welcome to the
Modem
Configuration Utility.
```

```
Current Configuration
COM Port 4
IRQ 3
```

Your Modem requires the use of a COM Port and Interrupt. You can change the settings shown or press the F5 key to configure your modem automatically.

```
ESC..Exit
F3...Change Settings
F5...Use Automatic Settings
F7...View COM Port Info
F10..Save & Exit
```

Press **ESC...** to exit without saving  
Press **F3...** to change settings.  
Here, you can change your current COM port/IRQ assignments. If you enter an incorrect setting, setup will display available valid choices.

Press **F5...** to run automatic settings. Modem Setup will determine and configure the best COM port and IRQ assignments for the modem in your system.

### **(RECOMMENDED)**

Press **F7...** to view existing COM port/IRQ assignments. No changes are made to your configuration.

Press **F10...** to save and exit setup. Choose an option, write down the settings (see note below), and press F10 to save.

## 2.5 Testing the Connection

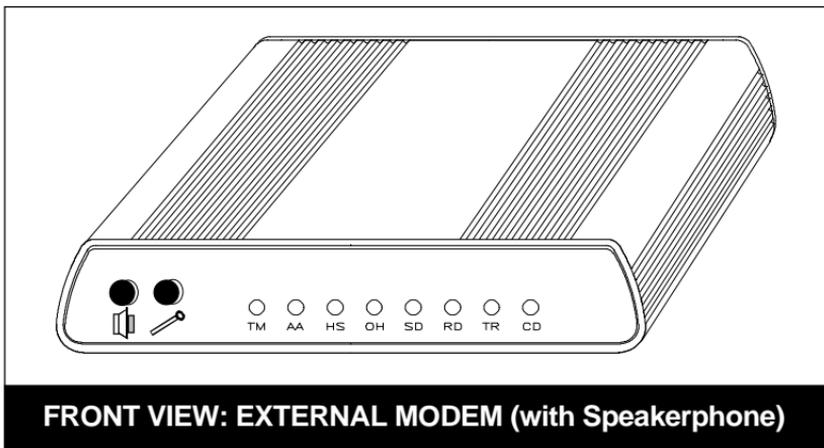
1. Install and start your communications software. Then place it in terminal mode. Refer to the program's documentation if you require assistance. **If you are not in terminal mode, AT commands typed in at the DOS prompt will result in a "Bad Command or File Name" message.**
2. Type in **ATZ** followed by ENTER and the modem will respond with OK after a few seconds. If the modem does not respond OK, refer to *Troubleshooting (Section Four)*.
3. Type **ATH1** followed by ENTER and you should hear a dial tone from the modem speaker. To adjust speaker volume, refer to your communications software's on-line help, or see p. 58 of this manual under the heading "Speaker Volume".
4. Type **ATH** followed by ENTER to put the modem "on-hook". This confirms that the modem has been successfully installed into the computer.
5. Your modem is now ready for use. Continue now with your communications software and documentation.

## Section Three: Installation (External Model)

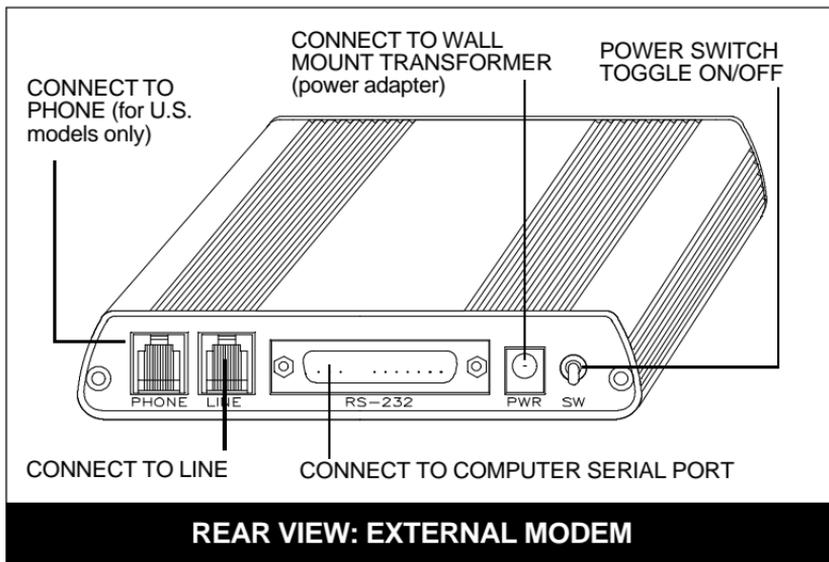
This section explains how to install the external modem in your computer. Review the contents of your package to make sure all items are present. **If any items are missing or damaged, contact the dealer from whom you purchased the modem for assistance. Also note that phone cable configuration will vary for international settings.**

### 3.1 Installing the Modem

- The communication settings are controlled by the software that manipulates the serial interface present in your system. The external modem is connected to that interface.
- Operating the modem with a computer requires communications software, either as a stand-alone product, or as part of an application program.
- You will need an RS-232 serial cable to attach the modem to your computer. Check the rear of your system for a 9- or 25-pin serial port. The modem requires a DB-25 pin male cable connector. The computer's serial port requires a 9- or 25-pin female cable connector.



Note the status indicators as explained on the next page.



| Indicator | Definition     | Status  |
|-----------|----------------|---|
| TM        | Test Mode      | <b>FLASHES</b> when modem is in test mode and if any errors are detected.   |
| AA        | Auto Answer    | <b>ON</b> when in Auto Answer mode and when online with the host modem.   |
| HS        | High speed     | <b>ON</b> when the modem is powered on or communicating with another modem at 4800bps or faster.                      |
| OH        | Off Hook       | <b>ON</b> when the modem takes control of the telephone line to establish a data link.                                |
| SD        | Send Data      | <b>FLASHES</b> when a data bit is sent to the modem by the computer.  |
| RD        | Received Data  | <b>FLASHES</b> when a data bit is received from the phone line, or when the modem sends result codes to the computer. |
| TR        | Terminal Ready | <b>ON</b> when the modem receives a data terminal ready signal from the computer via the RS-232 cable.                |
| CD        | Carrier Detect | <b>ON</b> when the modem receives a valid data signal (carrier) from a remote modem. Ready for data transmission.     |

## Connecting the Phone Line

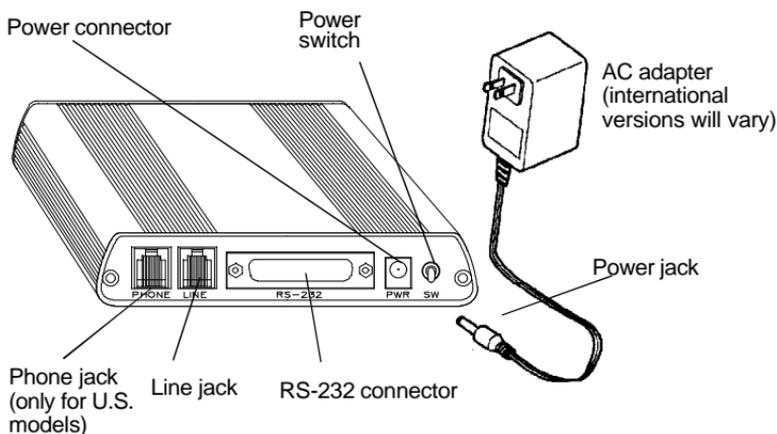
An RJ-11 cable is required for your modem to function. This section contains information you will need before you connect the telephone line to the modem and explains how to make the proper connections from the modem to your telephone line.

Before you connect the telephone line to the modem, you should familiarize yourself, if you haven't done so already, with the information provided in the Appendix of this manual concerning FCC and telephone company requirements.

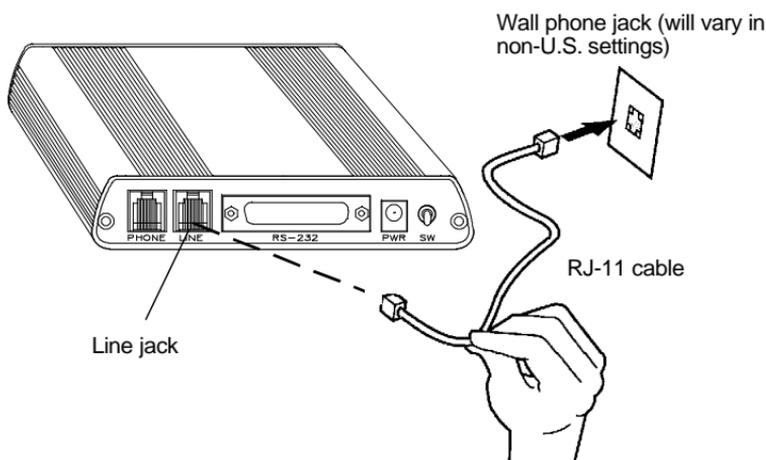
## Preparing the Modem

Follow these simple steps to connect the modem to your computer:

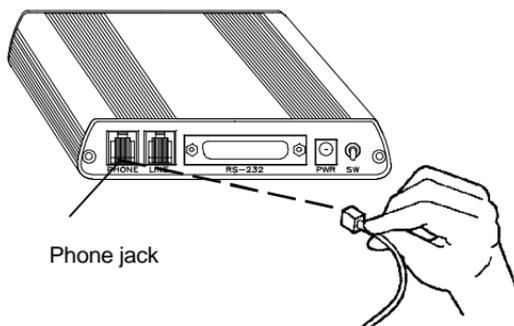
1. Turn off your computer and all peripheral devices.
2. Examine the back of the modem and review the attached interfaces as shown previously.
3. Check to make sure that the power switch is **OFF (DOWN)**. Then plug the small end of the power adapter into the power jack on the back of the modem and plug the power adapter into a standard 110V (or 220V) AC wall socket.



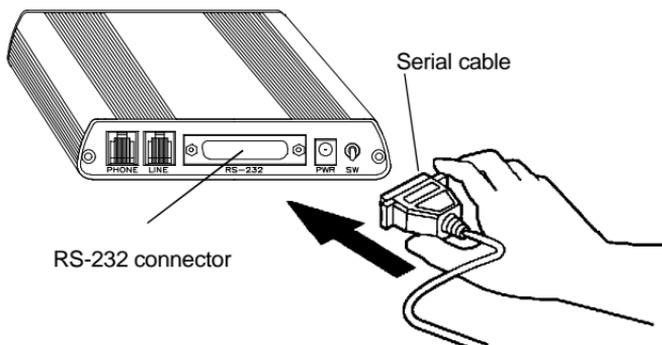
4. Disconnect your present phone cord from the wall jack. Plug the end of the phone cord that came with the modem into the wall jack, and the other end into the RJ-11 jack at the rear of the modem marked **LINE**.



If you want to keep your telephone connected for conventional calls, plug its cord into the other jack at the rear of the modem labeled **PHONE** (only for U.S. models).



5. Connect the modem to the computer's serial port with a serial cable (not supplied).



---

Line connection is complete for non-speakerphone model. If you are connecting microphone and speaker(s) to the modem, continue with step 6. Otherwise, continue with Modem Setup for either Windows 95 (page 39); Windows NT (page 41); Windows 3.x (page 37).

6. Connect devices to microphone and speaker jacks on the front panel of the modem (if present on your model).

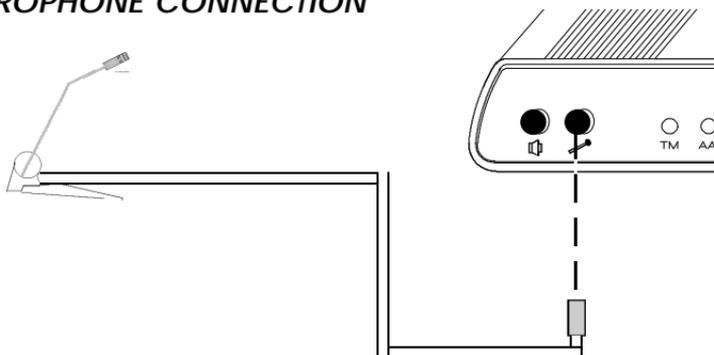
***a. If you have an existing sound card, continue below. If you do not have a sound card, skip to step b.***

- Attach a microphone to the jack on the modem labelled **MIC** or marked with the symbol (  ) (to record outgoing messages; in addition the microphone serves as a transmitter for your speakerphone).
- Attach the mono-end of a stereo-mono cable to the jack labelled **SPK** or marked with the symbol (  ) on the modem (to listen to phone messages through your sound board). E.g., playback, call monitoring.
- Attach the stereo-end of a stereo-mono cable to the line-in connector on your sound card. If your sound card does not have a line-in connector, you will need to attach a speaker(s) to the speaker jack.

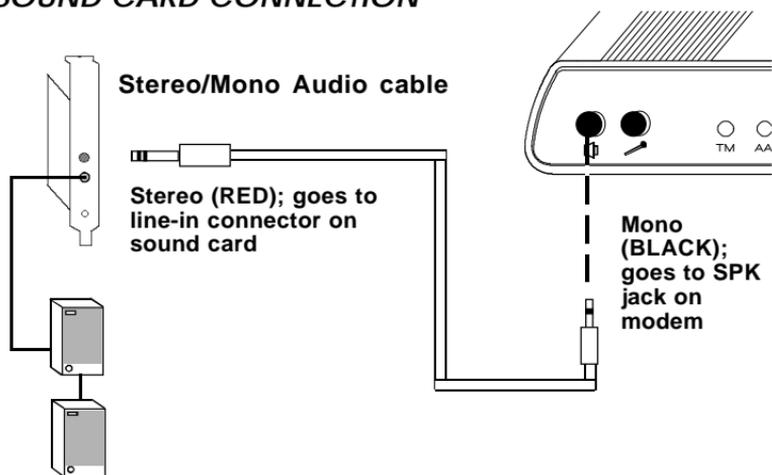
***b. If you do NOT have an existing sound card:***

- Connect a microphone to the jack on the modem labelled **MIC** or marked with the symbol (  ) (to record outgoing messages; in addition the microphone serves as a transmitter for your speakerphone).
- Connect a speaker(s) to the jack on the modem labelled **SPK** or marked with the symbol (  ) (to listen to incoming messages; in addition, the speaker serves as a receiver for your speakerphone).

## MICROPHONE CONNECTION



## SOUND CARD CONNECTION



Line connection is complete. Switch **ON** the modem (switch in the **UP** position), power up your computer. Continue with Modem Setup for either Windows 95 (page 39); Windows NT (page 41); Windows 3.x (page 41).

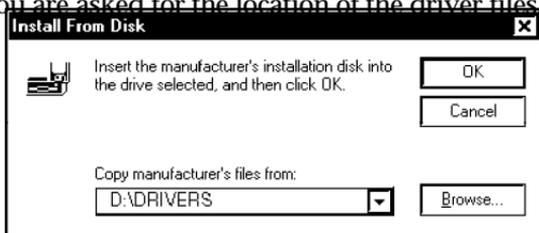
## 3.2 Modem Setup for Windows 95 Users

Make sure you have:

- Connected the modem to the serial port
- Plugged in the power supply
- Powered on the modem

**Please check the version of Windows 95 that you are using. Right click on the “My Computer” icon on the desktop and select “Properties”. Under “System”, if your version reads 4.00.950 B, then you have OEM Service Release 2 of Windows 95. In this case, follow the instructions on the next page. Otherwise, continue immediately below.**

1. Start Windows 95 as you normally would.
2. When Windows 95 detects new hardware, it displays the “**New Hardware Found**” dialog box. Here, you are asked what driver files are associated with the new hardware.
3. From the choices given, select **Driver from disk provided by hardware manufacturer**.
4. Windows 95 then displays the “**Install from Disk**” dialog box. Here, you are asked for the location of the driver files.



5. Type the path for the location of the drivers (D:\DRIVERS, if your modem came with a CD), or A:\ or (B:\) if the modem came with a CD. Then insert the CD into your CD-ROM drive or the driver diskette into your diskette drive.
6. Windows 95 may ask you for your original Windows 95 installation CD or diskettes. The modem is now ready to be tested and

operated. Continue with 3.5 *Testing the Connection*

## For Windows 95 Version 4.00.950 B:

1. When Windows 95 detects new hardware, it starts the “**Updated Device Driver Wizard**”.

a. **If you received an installation CD**, select **Have Disk**.

Then:



1. Insert the CD and click **Next**.
2. Type the path for the location of the drivers (D:\DRIVERS).

b. **If you received an installation diskette**, select **Have Disk**. Then:



1. Insert the diskette and click **Next**.
2. Type the path for the location of the drivers (A:\ or B:\).

2. After Windows 95 finishes searching for updated drivers, click on the “**Other Locations**” button and type D:\DRIVERS (or A:\ or B:\) in the “**Location**” field.

3. Complete the installation by clicking on the the **Finish** button. Windows 95 may prompt you for your original Windows 95 installation CD or diskettes.

**NOTE: After Windows 95 finishes copying files, it will detect another device called Voice Modem Serial Wave Device. Simply follow the same instructions as for the modem installation above.** Congratulations! Setup is complete for Windows 95 users. Continue with 3.5 *Testing the Connection*.

### 3.3 Modem Setup for Windows NT Users

1. Double-click on the **Modems** icon.
2. At the **Install New Modem** screen, check the box in front of **“Don’t Detect my Modem; I Will Select it from a List”**.
3. Select **Next**, then **Have Disk**. Insert the Modem Drivers Installation Disk into your diskette drive.
4. Type A:\, then click **OK**.
5. Highlight and select the modem which corresponds to the one you purchased, then **Next**.
6. Select the COM port to which the modem was attached. Then select **Next**, then **Finish**. Congratulations! Setup is complete for Windows NT.

The modem is now ready to be tested and operated. Continue with *3.5 Testing the Connection*.

### 3.4 Modem Setup for Windows 3.x/MS-DOS Users

1. If your system boots into Windows, exit to a DOS prompt.
2. Insert the CD or diskette containing the COMCHECK program and type:

**D:\DRIVERS\COMCHECK** (if CD)  
**A:\COMCHECK or B:\COMCHECK** (if diskette)

3. Follow the on-screen instructions. COMCHECK will instruct you on what ports are available on your system and how to connect an available port to the modem.

The modem is now ready to be tested and operated. Continue with *3.5 Testing the Connection*.

---

## 3.5 Testing the Connection

To verify that your modem is working properly, follow these steps:

1. With your communications software loaded, place it in terminal mode. Refer to the program's documentation if you require assistance. **If you are not in terminal mode, AT commands typed in at the DOS prompt will result in a "Bad Command or File Name" message.**
2. Type in **ATZ** followed by ENTER and the modem will respond with OK after a few seconds. If the modem does not respond OK, refer to *Troubleshooting (Section Four)*.
3. Type **ATH1** followed by ENTER and you should hear a dial tone from the modem speaker. To adjust speaker volume, refer to your communications software's on-line help, or see p. 58 of this manual under the heading "Speaker Volume".
4. Type **ATH** followed by ENTER to put the modem "on-hook". This confirms that the modem has been successfully installed into the computer.
5. Your modem is now ready for use. Continue now with your communications software and documentation.

**NOTE: In order to get optimum performance from the external modem, you will need to have a 16C550/650 UART chip on your serial port. Without the 16C550/650 UART, errors may result while uploading and downloading. If necessary, contact your dealer for information on high-speed serial I/O products.**

## Section Four: Troubleshooting

This section lists common problems that may be encountered and their possible solutions. **NOTE: All “AT” commands must be typed from your communication software’s terminal screen.**

| SYMPTOM   | POSSIBLE REMEDY   |
|---|---|
| <b>No dial tone.</b>                            | <ul style="list-style-type: none"><li>■ Verify that you have cables plugged in correctly as instructed in Section Two or Three.</li><li>■ Connect a telephone set directly to the wall jack and check for a dial tone. If no dial tone is heard, the telephone line is not working. Contact the telephone company.</li></ul>  |
| <b>Modem will not connect to another modem.</b> | <ul style="list-style-type: none"><li>■ Check the connections between the modem and the computer, and the modem and the telephone line.</li><li>■ Make sure the telephone jack is operational as described above.</li><li>■ The telephone line may be in use at a different extension.</li><li>■ Perhaps the number you have called does not reach a modem, or the remote modem may not be set up to respond.</li></ul> |
| <b>No response when you type in AT commands</b> | <ul style="list-style-type: none"><li>■ There may be a conflicting port address. Re-configure the modem’s COM port address (<b>INTERNAL MODEL ONLY</b>).</li></ul>  |

| SYMPTOM   | POSSIBLE REMEDY   |
|---|---|
| <b>No response when you type in AT commands (contd)</b>                               | <ul style="list-style-type: none"><li>■ Verify that the communication software is set to the same communications port where your modem is attached (e.g., COM1, COM2). Check IRQ settings in your software and on the modem.</li><li>■ Check your serial cable connection (<b>EXTERNAL MODEL ONLY</b>).</li><li>■ Try typing AT&amp;F to reset the modem to its factory defaults.</li><li>■ Move the modem to another serial port (<b>power down the host computer first</b>). If the modem works after being moved, it's likely the problem is not with the modem.</li></ul> |
| <b>AT commands not visible.</b>   | <ul style="list-style-type: none"><li>■ Make sure the echo command is set to ON. Change to echo with the ATE1 command.</li></ul>  |
| <b>After data connection is established, data is displayed as garbled characters.</b> | <ul style="list-style-type: none"><li>■ Make sure the local (yours) and remote modem configurations are compatible.</li><li>■ Turn off your modem (<b>EXTERNAL</b>), exit, and re-run your communication software.</li><li>■ Verify that both modems are operating with the same settings, speed, data, parity, and stop bits.</li><li>■ The software may not be set for correct terminal emulation. Configure software to correct type. ANSI terminal emulation is most commonly used.</li></ul>   |

| <b>SYMPTOM</b>                                     | <b>POSSIBLE REMEDY</b>   |
|--|--|
| <b>Garbled characters (contd)</b>                  | <ul style="list-style-type: none"><li>■ Power down your system (<b>INTERNAL</b>) and re-run your communications software. Check software settings.</li><li>■ Exit the communications program and restart it.</li></ul>   |
| <b>The modem does not answer an incoming call.</b> | <ul style="list-style-type: none"><li>■ You may not have enabled auto-answer. Use your software to enable this function.</li><li>■ If you have an answering machine, it may be answering before the modem can. Turn the answering machine off, or, use the software to set auto-answer to respond in fewer rings than the answering machine.</li></ul> |
| <b>Modem disconnects while on-line.</b>            | <ul style="list-style-type: none"><li>■ Check for any loose connections.</li><li>■ Re-try the connection by dialing the number several times. You may be experiencing line interference.</li><li>■ An incoming call may have broken the connection if a call-waiting feature was enabled. Disable call-waiting and try again.</li></ul>                |

| SYMPTOM   | POSSIBLE REMEDY  |
|---|--|
| <b>I am having trouble getting my init string to work.</b>  | <ul style="list-style-type: none"><li>■ Init strings are primarily personal preferences. Use the most basic one that can get the job done. An &amp;Q6 (which disables error control) is optional.</li></ul>  |
| <b>Connection Errors</b>                                    | <ul style="list-style-type: none"><li>■ Try connecting at a lower speed (e.g., 14,400 or 9600bps).</li><li>■ Turn off error correction/compression with an AT&amp;Q6%0 command.</li><li>■ Noisy/poor line conditions may prohibit connection. Have your phone company test your lines.</li><li>■ Verify that the modem at the other end is up to date and compliant with current CCITT-ITU and Bell standards.</li></ul> |
| <b>Problem Connecting to On-line subscription services.</b> | <ul style="list-style-type: none"><li>■ Some on-line services require that your modem be configured to run with error correction and data compression turned <b>OFF</b>. The easiest way to accomplish this is by using the command <b>AT&amp;Q6</b> and setting the communication software to the correct baud rate for the service you are calling (e.g., 2400, 9600bps).</li></ul>                                    |

| SYMPTOM   | POSSIBLE REMEDY   |
|---|---|
| <b>Problem Connecting to On-line subscription services (contd).</b> | If you still have problems connecting, try forcing the modem to connect up at the slower speed with the commands <code>AT&amp;Q6N0S37=6</code> for 2400 baud, and <code>AT&amp;Q6N0S37=9</code> for 9600 baud services. |
| <b>Download terminates abnormally.</b>                              | <ul style="list-style-type: none"><li>■ Make sure the <code>AT&amp;R1</code> is set in your active profile.</li></ul>   |
| <b>Microphone fails to work.</b>                                    | <ul style="list-style-type: none"><li>■ Make sure attached microphone is working and conforms to necessary specifications. See Section One.</li><li>■ Make sure microphone is plugged into correct jack.</li></ul>      |
| <b>Speaker fails to work.</b>                                       | <ul style="list-style-type: none"><li>■ Make sure attached speaker is working and conforms to necessary specifications. See Section One.</li><li>■ Make sure speaker is plugged into correct jack.</li></ul>            |

---

## Appendix A: Technical Specifications

### Data

- K56Flex\*, 33600\*\*, 31200\*\*, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 300
- V.34, V.32bis, V.32, V.23, V.22bis, V.22, V.22A/B, and V.21; Bell 212A and 103 DTE data rate up to 230.4bps
- Parallel 16C550A UART support (internal models only)
- Serial ITU-T V.24 (EIA/TIA-232-E) support (external models only)
- Industry standard AT command set
- 2K increment speed steps between 33600 and 56Kbps\*
- Supports Error Correction V.42 LAPM, MNP 2-4, MNP10-EC
- Supports Data Compression V.42bis, MNP5

### Fax

- Fax speeds of 14400, 12000, 9600, 7200, 4800, 2400
- ITU-T V.17, V.29, V.27ter, V.21 ch2
- Class 1, Group 3 fax support

**Audio Data Rate:** 11.025kHz, 7.2kHz sample rate (speakerphone models only)

- Diagnostics:**
- Local/remote digital and analog loopback.
  - Automatic power-on self-test.

### Power

+5V, 1.2 watts (maximum)  
+/-12V, 0.5 watts (maximum) (from host computer power supply)

\* (for models supporting 56K only; also supports intermediate connect rates of 54000, 52000, 48000, 46000, 44000, 42000, 40000, 38000, 36000, 34000, 32000)

\*\* on 33.6 modems only

## Appendix B: Regulatory Statements

### FCC Statement:

“This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received including interference that may cause undesired operation.

### **THIS UNIT COMPLIES WITH FCC PART 68 AS OF DATE OF MANUFACTURE.**

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antennae.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user’s authority to operate the equipment.”

### ***Notification to the Telephone Company***

Notification to the telephone company is no longer required prior to connecting the registered equipment but upon request from the telephone company the user shall tell the telephone company which line the equipment is connected to as well as the registration number and the ringer equivalence of the registered protective circuitry. In most, but not all areas, the sum of all RENs should be 5.0 or less. The FCC Registration number and Ringer Equivalence number are printed on the main chip in the center of the internal modem board.

### ***Malfunction of the Equipment***

In the event that the modem should fail to operate properly, the customer shall disconnect the equipment from the telephone line to determine if it is the customer's equipment which is not working properly, or if the problem is with the modem, the user shall discontinue use until it is repaired. In the event service is needed the user should contact the vendor from whom you purchased the modem.

### ***Telephone Connection Requirements***

Except for telephone company-provided ringers, all connections to the telephone network shall be made through standard plugs and standard telephone company-provided jacks, or equivalent, in such a manner as to allow for easy and immediate disconnection of the terminal equipment. Standard jacks shall also be arranged that, if the plug connected thereto is withdrawn, no interference to the operation of the equipment at the customer's premises which remains connected to the telephone network, shall occur by reason of such withdrawal.

### ***Incidence of Harm***

Should terminal equipment or protective circuitry cause harm to the telephone network, the telephone company shall, where practical, notify the customer that temporary discontinuance of service may be required; however, where prior notices are not practical, the telephone company may temporarily discontinue service if such action is deemed reasonable in the circumstances. In the case of such temporary discontinuance, the telephone company shall promptly notify customers and will be given the right to bring a complaint to the FCC if they feel the disconnection is not warranted.

### *Changes in Telephone Company Equipment or Facilities*

The telephone company may make changes in its communications facilities, equipment, operations, or procedures, where such action is reasonably required and proper in its business. Should any such changes render the customer's terminal equipment incompatible with the telephone company facilities, the customer shall be given adequate notice to make modifications to maintain uninterrupted service.

### *General*

The FCC prohibits customer-provided terminal equipment be connected to party lines or to be used in conjunction with coin telephone service.

### *Installation*

The modem is equipped with a USOC RJ-11 standard miniature modular jack and is designed to plug directly into a modular jack.

### **CANADIAN STANDARDS ASSOCIATION**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### **Industry Canada Information**

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunction, may give the telecommunications company cause to request the user to disconnect the equipment.

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Users should ensure, for their own protection, that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.

**NOTICE:** The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence numbers of all the devices does not exceed 5.

***CAUTION Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.***

The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the load numbers of all the devices does not exceed 100. The Load number appears on the underside of the modem.

**To be installed in UL-listed and CSA-certified computers with instructions on how to add/remove expansion cards.**

**The RAL number of this equipment is 0.7. This number denotes the number of items that may be attached to a telephone line. The sum of all the items connected to a line should not exceed a sum of 5.**

**This device is not intended to be used in parallel with other devices. The operation of this equipment on the same lines as telephones or other equipment with audible warning devices or automatic ring detectors may give rise to bell tinkle or noise and may cause tripping of the ring detector. The user should not report such occurrences as faults.**

**When relocating the equipment, always disconnect the telecomm line connection before the power, and reconnect the power first.**

**NOTE THAT FAILURE TO MEET THE ABOVE REQUIREMENTS MAY NEGATE THE USER RIGHTS UNDER THE TELECOMM TERMS OF SERVICE**

**AUSTEL**AUSTRALIAN  
TELECOMMUNICATIONS  
AUTHORITY(applies to Australian-  
certified modem only)

**WARNING: Only connect on an AUSTEL permitted or certified component listed headset or handset to this port.** This modem has a protective cover over a telecommunications network voltage (TNV) circuit. Removal of the protective cover will render the AUSTEL permit void.

**Headsets, Handsets, and Microphones**

Only connect an Austel permitted or certified component listed headset, handset, and/or microphone to CE port(s).

**Voice Issues**

Distortion generated because of low bit rate voice may reduce voice quality.

---

**NOTICE ON FAX TRANSMISSIONS**

The *Telephone Consumer Protection Act of 1991* makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message **unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual.** (The telephone number provided may not be a 900 number or any other number for which charges exceed local or long-distance transmission charges.) Consult the procedures in the documentation for the fax software you are using with this modem product for the best way to accomplish the above requirements.

## COMPLIANCE INFORMATION STATEMENT

We,

Boca Research, Inc.  
1377 Clint Moore Road  
Boca Raton, FL 33487

***declare under our sole responsibility that the product,***

Type of Equipment: Modems

Model Numbers: **M561/E, GMSVDI/E, MV.34I/ED**

***to which this declaration relates is in conformity with the title 47 of the US Code of Federal Regulations, Part 15, covering Class B personal computers and peripherals.***

**Operation is subject the following two conditions:**

**(1) this device may not cause harmful interference, and  
(2) this device must accept any interference received, including interference that may cause undesired operation.**

## DECLARATION OF CONFORMITY

(In accordance with EN 45014)

We,

Boca Research, Inc.  
1377 Clint Moore Road  
Boca Raton, FL 33487 USA

***declare under our sole responsibility that the product,***

Type of Equipment: Modems

Model Numbers: **M561/E, GMSVDI/E, MV.34I/ED**

***to which this declaration relates is in conformity with the following standards or other normative documents:***

Safety: The Product complies with the requirements of the low voltage directive 73/23/EEC, EN 60950 (1992), A1 & A2

EMC: EN 55022 (1993) Class B

EN 50082-1 (1992)

IEC 801-2 (1991), 4kV CD; 8kV AD

IEC 801-3 (1984), 3 V/m

IEC 801-4 (1988), 0.5 kV Signal Lines, 1 kV AC Power Lines

***following the provision of EMC directive 89/336/EEC***

Boca Raton, Florida USA

Signature and Date: available on request

Typed Name and Title: available on request

European Contact: **Boca Research Holland**



## WARNING/ATTENTION

**#1 CAUTION:** THIS MODEM CARD IS INTENDED TO BE INSTALLED IN CSA CERTIFIED EQUIPMENT IN THE FIELD BY THE USER IN THE MANUFACTURER'S DEFINED OPERATOR ACCESS AREA. CHECK THE EQUIPMENT OPERATING/INSTALLATION INSTRUCTIONS AND/OR EQUIPMENT MANUFACTURER TO VERIFY/CONFIRM IF YOUR EQUIPMENT IS SUITABLE FOR USER-INSTALLED APPLICATION CARDS."

**ATTENTION:** CETTE CARTE MODEM EST DESTINEE A ETRE INSTALLEE PAR L'UTILISATEUR, SUR PLACE ET A L'INTERIEUR DE LA ZONE DEFINIE PAR LA FABRICANT, DANS UN APPAREIL CERIFIE CSA. CONSULTER LE MODE D'EMPLOI OU LE FABRICANT DE L'APPAREIL POUR VERIFIER OU CONFIRMER SI L'UTILISATEUR PEUT Y INSTALLER LUI-MEME DES CARTES PERIPHERIQUES."

**#2 CAUTION:** ALWAYS DISCONNECT MODEM BOARD (THE ONE WITH THE TELEPHONE/PLUG JACK) FROM THE TELEPHONE SYSTEM WHEN INSTALLING OR WHEN COVERS ARE REMOVED FROM THE HOST PRODUCT."

**ATTENTION:** TOUJOURS DEBRANCHER LA LIGNE TELEPHONIQUE DE LA CARTE MODEM (MUNIE D'UNE PRISE OR D'UNE FICHE) AVANT DE PROCEDER A L'INSTALLATION DANS L'APPAREIL OU LORSQUE LE COUVERCLE DE CELUI-CI EST RETIRE."

**#3 CAUTION:** APPLY THE ENCLOSED ADHESIVE WARNING LABEL TO THE OUTSIDE OR INSIDE OF THE EQUIPMENT ENCLOSURE ADJACENT TO THE MODEM CARD."

**ATTENTION:** APPOSER L'ETIQUETTE AUTOCOLLANTE DE MISE EN GARDE CHNCLUSE SURE LE PAROI EXTERIEURE OU INTERIEURE DU BOITIER DE L'APPAREIL. PRES DE LA CARTE MODEM.

**CAUTION:** Telecommunications voltages and currents can exceed the limits of safety extra low voltage (SELV), resulting in personal injury. Do not touch any components on the modem's printed circuit board when power is applied, or the telephone cable is plugged in.

**Avoid installing, handling the telephone cable, or changing the jumper settings on the modem during any weather activity where lightning strikes may occur.**

**This unit is intended for installation in computing devices that are non-operator accessible. Installation is to be performed by qualified service personnel only**

## Appendix C: Modem Command Reference

BASIC AT COMMANDS  
(default values are highlighted)

| Command | Description |
|---------|-------------|
|---------|-------------|

|     |                         |
|-----|-------------------------|
| AT  | Attention characters    |
| ATA | Answer command          |
| AT/ | Re-Execute last command |

**NOTE: AT command functionality may vary in international settings. Command definitions listed in subsequent pages reflect domestic (U.S.) functionality. Also, AT command functionality may vary slightly from model to model.**

### Dial Modifiers

| Dial | Options  | Description   |
|------|----------|---|
| ATD  | 0-9,*,#  | DTMF digits   |
|      | L        | Re-dial last number.  |
|      | P        | Pulse (rotary) dial. 10 pulses per second.  |
|      | <b>*</b> | <b>Not supported in Holland, Norway, Sweden, and Denmark</b>  |
|      | T        | Touch tone dial (DTMF).   |
|      | W        | Wait for dial tone for 1-255 seconds. Default is 50 seconds (this value is set by the S7 register). |
|      | ,        | (Comma) Pause for 0-255 seconds. Default is 2 seconds (this value is set by the S0 register).       |
|      | @        | Wait for quiet answer.  |
|      | !        | Initiate hook flash.  |
|      | ,        | Return to command state after dialing.  |
|      | ^        | Disable calling tone.   |
|      | S=n      | Dial stored number. (See AT&Z). n=0-3.  |

| Command | Description |
|---------|-------------|
|---------|-------------|

### Command Character Echo

|      |  |
|------|--|
| ATE0 | Disables echoing of the commands to the screen.                  |
| ATE1 | <b>Enables echoing of the commands to the screen. (default).</b> |

---

**Command    Description**

---

**Disconnect (hang-up)**

---

|      |                                 |
|------|---------------------------------|
| ATH0 | Instructs modem to go on-hook.  |
| ATH1 | Instructs modem to go off-hook. |

---

**Identification**

---

|      |  |
|------|--|
| ATI0 | Displays the product identification code. Example: 33600   |
| ATI1 | Displays the checksum.   |
| ATI2 | Displays ROM checksum as OK or ERROR.  |
| ATI3 | Displays the firmware revision level.  |
| ATI4 | Reports OEM-defined identifier string.   |
| ATI5 | Reports country code.  |
| ATI6 | Reports modem data pump model.   |
| ATI7 | Reports DAA code (e.g., 000 for U.S./Canada; 016 for Japan, 033 for Belgium, 034 for Finland, 035 for France, 037 for Italy, 038 for Netherlands, 039 for Sweden, 040 for Switzerland, 041 for U.K.) |

---

**Speaker volume**

---

|             |                              |
|-------------|------------------------------|
| ATL0        | Low volume.                  |
| <b>ATL1</b> | <b>Low volume. (default)</b> |
| ATL2        | Medium volume.               |
| ATL3        | High volume.                 |

---

**Speaker control**

---

|             |  |
|-------------|--|
| ATM0        | Disables the modem speaker.  |
| <b>ATM1</b> | <b>Turns speaker on until carrier has been detected. (default)</b>                 |
| ATM2        | Speaker is always on.  |
| ATM3        | Speaker is on when receiving carrier and during dialing, but off during answering. |

---

**Automode enable**

---

|             |   |
|-------------|---|
| ATN0        | Requires speed of the connection be that specified by the value of S37.     |
| <b>ATN1</b> | <b>Permits handshaking at any speed supported by both modems. (default)</b> |

---

**High-Speed Modem**

---

---

**Command    Description**

---

**Return to on line state mode**

---

|      |   |
|------|---|
| ATO0 | Switches the modem from command mode to on-line mode without dialing.                   |
| ATO1 | Switches from command mode to on-line mode and initiates an equalizer retrain sequence. |

---

**Mode responses**

---

|             |   |
|-------------|---|
| <b>ATQ0</b> | <b>Enables result codes to be issued to the screen. (default)</b> |
| ATQ1        | Disables result codes to be issued to the screen.                 |

---

**Result code format**

---

|             |                                 |
|-------------|---------------------------------|
| ATV0        | Numeric format.                 |
| <b>ATV1</b> | <b>Verbal format. (default)</b> |

---

**Error correction message control**

---

|             |   |
|-------------|---|
| <b>ATW0</b> | <b>Error correction call progress not reported. (default)</b>                             |
| ATW1        | Call progress reported.   |
| ATW2        | Call progress not reported. Connect xxxx message reports DCE speed (e.g., CONNECT 28800). |

---

**Extended result codes**

---

|      |  |
|------|--|
| ATX0 | Disables monitoring of busy tones unless forced otherwise by country requirements; sends only OK, CONNECT, RING, NO CARRIER, ERROR and NO ANSWER result codes.                             |
| ATX1 | Disables monitoring of busy tones unless forced otherwise by country requirements; sends only OK,CONNECT, RING, NO CARRIER, ERROR, NO ANSWER and CONNECT XXXX result codes.                |
| ATX2 | Disables monitoring of busy tones unless forced otherwise by country requirements; sends only OK, CONNECT, RING, NO CARRIER, ERROR, NO DIAL TONE, NO ANSWER and CONNECT XXXX result codes. |

---

**Command    Description**

|             |   |
|-------------|---|
| ATX3        | Enables monitoring of busy tones; sends only OK, CONNECT, RING, NO CARRIER, ERROR, NO DIALTONE, NO ANSWER and CONNECT XXXX. |
| <b>ATX4</b> | <b>Enables monitoring of busy tones and sends all messages. (default)</b>   |

---

**Control long space disconnect**

---

|             |  |
|-------------|--|
| <b>ATY0</b> | <b>Disables long space disconnect. (default)</b> |
| ATY1        | Enables long space connect.                      |

---

**Soft reset and restore profile**

---

|      |                            |
|------|----------------------------|
| ATZ0 | Restores stored profile 0. |
| ATZ1 | Restores stored profile 1. |

---

**Escape Characters**

---

|     |  |
|-----|--|
| +++ | The escape characters are known as +++. They will switch from on-line mode to command mode while preserving the connection with the on line modem. |
|-----|--|

---

**SVD Function**

---

|          |   |
|----------|---|
| AT-SMS=2 | This command must be added to your initialization string for the modem to work in SVD mode. |
|----------|---|

---

**Speakerphone**

---

|          |  |
|----------|--|
| AT#VLS=6 | This command must be added to your initialization string for the modem to work in full-duplex speakerphone mode. |
|----------|--|

---

---

 Extended AT Commands

**Command    Description**


---

**Data carrier detect (DCD) signal**


---

|                  |   |
|------------------|---|
| AT&C0            | Forces DCD signal to be on at all times.                    |
| <b>AT&amp;C1</b> | <b>DCD on indicates presence of data carrier. (default)</b> |

---

**Data terminal ready (DTR) signal.**


---

Interprets the ON to OFF transition of the DTR signal from the DTE according to the &Q settings.

|                  |  |
|------------------|--|
| AT&D0            | &Q0,5,6. DTR ignored.<br>&Q1,4. Modem hangs up; auto answer not affected.<br>&Q2,3. Modem hangs up; auto answer inhibited. |
| AT&D1            | &Q0,1,4-6. Asynchronous escape sequence.<br>&Q2,3. Modem hangs up; auto answer inhibited.                                  |
| <b>AT&amp;D2</b> | <b>&amp;Q0-6. Modem hangs up; auto answer inhibited. (default)</b>   |
| AT&D3            | &Q0,1,4-6. Modem does a soft reset as if the ATZ command were received;<br>&Q2,3. Modem hangs up; auto answer inhibited.   |

---

**AT&F            Recalls factory defaults.**


---

|       |                                  |
|-------|----------------------------------|
| AT&F0 | Restore factory configuration 0. |
| AT&F1 | Restore factory configuration 1. |

---

**DTE/Modem flow control**


---

|                  |   |
|------------------|---|
| AT&K0            | Disable flow control.   |
| <b>AT&amp;K3</b> | <b>Enable RTS/CTS (default for data mode)</b>                                   |
| AT&K4            | Enable XON/XOFF.  |
| AT&K5            | Enable transport XON/XOFF.  |
| <b>AT&amp;K6</b> | <b>Enable both RTS/CTS and XON/XOFF (default for fax modem and voice modes)</b> |

---

*Note on Flow Control. XON/XOFF is a software-based flow control method, using standard ASCII control characters to pause or resume data transmission. RTS/CTS pacing, a hardware-based method, uses an electrical signal. Signals are exchanged as follows:*

| <b>RECEIVER</b> |        | <b>TRANSMITTER</b>     |
|-----------------|--------|------------------------|
| CTS ON          | =====> | START SENDING          |
| CTS ON          | <====  | RTS ON (ready to send) |
| CTS OFF         | =====> | RTS OFF (stop sending) |

---

### Select pulse dial make/break ratio

---

**AT&P0**      **Selects a make/break ratio of 39/61 at 10pps. US and Canada. (default)**

AT&P1      Selects a make/break ratio of 33/67 at 10pps. UK and Hong Kong.

AT&P2      Same as 0 except at 20pps.

AT&P3      Same as 1 except at 20pps.

---

### Asynchronous mode

---

AT&Q0      Direct Asynchronous mode.

**AT&Q5**      **Modem negotiates an error-corrected link. (default)**

AT&Q6      Selects asynchronous operation in normal mode (i.e., speed buffering).

---

### RTS/CTS (Request to Send/Clear to Send)

---

AT&R0      Not supported.

**AT&R1**      **CTS will drop if required by flow control (default).**

---

### Data Set Ready (DSR) signal

---

**AT&S0**      **Causes DSR signal to be active at all times. (default)**

AT&S1      Causes DSR signal to become active after answer tone has been detected and inactive after carrier has been lost.

---

### High-Speed Modem

---

**Command    Description**

---

**Test and diagnostics**

---

|                  |   |
|------------------|---|
| AT&T0            | Terminates any test in progress.  |
| AT&T1            | Executes the local analog loopback test.  |
| AT&T3            | Executes the local digital loopback test.   |
| AT&T4            | Enables the modem to accept a request from a remote modem for a digital loopback test.                  |
| <b>AT&amp;T5</b> | <b>Instructs the modem to deny a request from a remote modem for a digital loopback test. (default)</b> |
| AT&T6            | Executes the remote digital loopback test.  |
| AT&T7            | Executes the remote digital loopback test with a self test.   |
| AT&T8            | Executes the remote analog loopback test with a self test.  |

---

**View Configuration**

---

AT&V        View current configuration and user profile.

---

**Store user profile.**

---

Saves the current configuration into non-volatile RAM as one of two user profiles.

AT&W0 Saves as user profile 0.

AT&W1 Saves as user profile 1.

---

**Designate default user profile**

---

AT&Y0        Selects user profile 0.

AT&Y1        Selects user profile 1.

---

**Stored phone number**

---

AT&Z0= Stores a 34 digit dial string.

AT&Z1= Stores a 34 digit dial string.

AT&Z2= Stores a 34 digit dial string.

AT&Z3= Stores a 34 digit dial string.

---

## MNP Operation

The modem supports all of the preceding classes. The following AT Commands apply to the MNP protocol. Default values are highlighted.

---

### Break Control

---

Determines the modem response when a BREAK is received from the DTE or the remote modem. The values of the parameters vary based on the three following conditions:

(1) When a break is received from the DTE during NORMAL or MNP mode:

AT\K0, 2, 4: modem enters command mode without sending a break to the remote modem.

AT\K1: modem clears the terminal and modem buffers and sends a break to the remote modem.

AT\K3: modem does not clear the buffers, but sends a break to the remote modem.

**AT\K5: modem sends a break to the remote modem in sequence with any transmitted data. (default).**

(2) When a break is received from the remote modem during NORMAL mode:

AT\K0, 1: modem clears the terminal and modem buffers and sends a break to the local DTE.

AT\K2, 3: modem does not clear the buffers but sends a break to the local DTE.

**AT\K4, 5: modem sends a break in sequence with any data being buffered. (default)**

(3) When a break is received from the DTE during DIRECT MODE mode:

AT\K0,1,3: modem sends a break to the remote modem and enters command mode.

**AT\K2, 4, 5: modem sends a break to the remote modem. (default)**

---

**Error Correction Operating Mode**

---

Selects the operating mode the modem uses while connected.

|       |   |
|-------|---|
| AT\N0 | NORMAL (speed buffering) mode.  |
| AT\N1 | DIRECT (pass-through) mode.   |
| AT\N2 | RELIABLE LINK mode. Specifies error correction for the modem-to-modem connection  |
| AT\N3 | AUTO-RELIABLE LINK mode. Attempts error-correction connection but will fall back to normal mode if unable to establish an MNP link. |
| AT\N4 | LAPM error correction mode.   |
| AT\N5 | MNP error correction mode   |

---

**Single Line Connect Message Enable**

---

Selects the operating mode the modem uses while connected.

|       |   |
|-------|---|
| AT\VO | Connect messages are controlled by the command settings X, W, and S95 |
| AT\V1 | Connect messages are displayed in single line format.                 |

## AT Commands for V.42/V.42bis

The following AT commands apply to the V.42/V.42bis protocol:

| <b>Command</b> | <b>Description</b> |
|----------------|--------------------|
|----------------|--------------------|

---

**Compression Control**

---

Determines whether or not modem will use data compression.

|              |   |
|--------------|---|
| AT%C0        | disables data compression                                       |
| AT%C1        | enables MNP5 data compression negotiation                       |
| AT%C2        | enables V42bis data compression.                                |
| <b>AT%C3</b> | <b>enables both V.42bis and MNP5 data compression (default)</b> |

---

**Command    Description**

---

**Auto-retrain**

---

Determines whether or not the modem automatically monitors the line quality and requests a retrain when necessary.

|       |  |
|-------|--|
| AT%E0 | disables line quality monitor auto-retrain   |
| AT%E1 | enables line quality monitor auto-retrain  |
| AT%E2 | <b>enables line quality monitor auto retrain and auto fall back/forward. (default)</b> |

---

**Report Received Signal Level**

---

AT%L            009 = -9 dBm, 010 = -10dBm, etc. all the way to 043 (-43 dBm)

Line signal and noise are determined by the unit of measurement dBm (decibel referenced to one milliwatt). To arrive at a signal/noise ratio, the noise level is subtracted from signal level in dBm.

---

**Report Line Signal Quality**

---

AT%Q            009 = -9 dBm, 010 = -10dBm, etc. all the way to 043 (-43 dBm)

Returns a “high-order” byte of the calculated EQM (“eye quality monitor”). This can range from 0 to 255. When the value is 8 or greater, the modem will automatically retrain if enabled by the AT%E1 command. The value for a normal connection ranges from 0 to 2 and approaches 8 for a progressively poorer connection. Returns an OK result code.

000 to 007      no retrain  
008 to 255      retrain performed if enabled by %E1.

---

## S-Registers

This section defines the purpose of the modem registers, and sequentially lists the registers and describes their functions. These registers affect various operating characteristics and allow you to obtain information about the modem, as well as test the modem. Each register has a factory-set value, which you can read or change to fit your needs.

### Reading a Register Value

To read the current value of a register, type:

```
AT Sn? [ENTER],
```

where n is a register number.

```
AT Sn? Sn? [ENTER] from the command mode.
```

To read the register values of S0 and S1, type

```
AT S0? S1? [ENTER].
```

The modem will display the first register value, a carriage return, the next register value, a carriage return, and OK or 0.

### Changing a Register Value

To change a register value, use the Sn command (ATSn=v), where n is a register number and v is the new value you want to assign to the register. Type:

```
AT S0=3 [ENTER]
```

to have the modem automatically answer on the third ring.

The table on the following page lists the modem's registers and their functions.

| Reg.      | Range                   | Units   | Default  | Definition   |
|-----------|-------------------------|---------|----------|--|
| S0        | 0-255                   | rings   | 0        | Auto-answer  |
| S1        | 0-255                   | rings   | 0        | Count incoming rings   |
| S2        | 0-255                   | rings   | 43       | Escape character value.  |
| S3        | 0-127                   | ASCII   | 13       | Carriage return character.                                       |
| S4        | 0-127                   | ASCII   | 10       | Line feed character.   |
| S5        | 0-255                   | ASCII   | 2        | Backspace character.   |
| S6        | 2-255                   | seconds | 2        | Wait time for Blind Dialing.                                     |
| S7        | 1-255                   | seconds | 50       | Wait for carrier after dial.                                     |
| S8        | 0-255                   | seconds | 2        | Pause time for dial delay.                                       |
| S9        | 1-255                   | seconds | 6 (0.6)  | Carrier detect.  |
| S10       | 1-255                   | seconds | 14 (1.4) | Lost Carrier to Hang Up Delay.                                   |
| S11<br>in | 50-255                  | ms      | 95 ms    | DTMF tone duration (*one-hundredth second increments)            |
| S12       | 0-255                   | seconds | 50(1)    | Escape code guard time*.<br>(*in one-fiftieth second increments) |
| S13       |                         |         |          | Reserved.  |
| S14       | Bit Mapped              |         | 138(8Ah) | Bit mapped registers.  |
| S15       |                         |         |          | Reserved   |
| S16       | Bit Mapped              |         | 0        | Modem test options.  |
| S17       |                         |         |          | Reserved.  |
| S18       | 0-255                   | seconds | 0        | Test timer.  |
| S19       | 0-255                   | seconds | 0        | AutoSync options.  |
| S20       | 0-255                   | seconds | 0        | AutoSync HDLC address.   |
| S21       | V.24/General Bit Mapped |         | 52(34h)  | Bit mapped registers.  |
| S22       | Speaker Results Status  |         | 117(75h) | Bit mapped registers.  |
| S23       | Bit Mapped              |         | 62(3Dh)  | Bit mapped registers.  |
| S24       | 0-255                   | seconds | 0        | Sleep Inactivity Timer.  |
| S25       | 0-255                   | seconds | 5        | Asynchronous DTR Delay.  |
| S26       | 0-255                   | seconds | 1        | RTS to CTS Delay Interval.                                       |
| S27       | Bit Mapped              |         | 73(49h)  | Bit mapped registers.  |
| S28       | Bit Mapped              |         | 0        | Bit mapped registers   |
| S29       | 0-255                   | ms      | 0        | Flash Dial Modifier Time.  |

| Reg.   | Range      | Units           | Default   | Definition                   |
|--------|------------|-----------------|-----------|------------------------------|
| S30    | 0-255      | tens of seconds | 0         | Disconnect Inactivity Timer. |
| S31    | Bit Mapped |                 | 194 (C2h) |                              |
| S32    | 0-255      | ASCII           | 17(11h)   | XON Character.               |
| S33    | 0-255      | ASCII           | 19(13h)   | XOFF Character.              |
| S34-35 |            |                 |           | Reserved.                    |
| S36    |            |                 | 7         | LAPM Failure Control         |
| S37    |            |                 | 0         | Line Connection speed        |

**NOTE: Desired sub-V.34 line connection speed. If an invalid number is entered, the number is accepted into the register, but S37 will react as though the default value has been entered. See the +MS command for more modulation selections.**

Bits 0-4:

**0 = Attempt auto mode connection (DEFAULT)**

1-3 = Attempt to connect at 300bps

4 = Reserved

5 = Attempt to connect at V.22 1200bps

6 = Attempt to connect at V.22bis 2400bps

7 = Attempt to connect at V.23

8 = Attempt to connect at V.32/V.32bis 4800bps

9 = Attempt to connect at V.32/V.32bis 9600bps

10 = Attempt to connect at V.32bis 12Kbps

11 = Attempt to connect at V.32bis 14.4Kbps

12 = Attempt to connect at V.32bis 7200bps

|     |                     |         |          |                             |
|-----|---------------------|---------|----------|-----------------------------|
| S38 | 0-255               | seconds | 20       | Delay Before Forced Hangup. |
| S39 | Flow Control Status |         | 3        | Bit Mapped Registers.       |
| S40 | Bit Mapped          |         | 104(68h) | Bit Mapped Registers.       |
| S41 | Bit Mapped          |         | 195(C3h) | Bit Mapped Registers.       |
| S46 | 136, 138            |         | 138      | Data Compression Control.   |

**NOTE:** 136 enables error correction with no compression; 138 enables error correction WITH compression.

| Reg. | Range     | Units | Default | Definition        |
|------|-----------|-------|---------|-------------------|
| S48  | 0, 7, 128 |       | 7       | V.42 Negotiation. |

**NOTE:** 0 disables negotiation and proceeds with LAPM; 7 enables negotiation; and 128 disables negotiation and proceeds with fallback action specified in S36. The default for S36 is to attempt an MNP connection.

|     |                  |     |  |                                |
|-----|------------------|-----|--|--------------------------------|
| S82 |                  |     | 128(40h)   | Break Handling Option.         |
| S86 | 0,4,5,9,12,13,14 | NA  |  | Connection Failure Cause Code. |
|     | 0                | =   | Normal disconnect; no error occurred.  |                                |
|     | 4                | =   | Loss of carrier  |                                |
|     | 5                | =   | V.42 negotiation failed to detect an error-correction remote modem.          |                                |
|     | 9                | =   | The modems could not find a common protocol.                                 |                                |
|     | 12               | =   | Normal disconnect initiated by the remote modem.                             |                                |
|     | 13               | =   | Remote modem does not respond after 10 re-transmissions of the same message. |                                |
|     | 14               | =   | Protocol violation.  |                                |
| S91 | 15               | dBm | 15   | PSTN Transmit Level.           |
| S92 | 15               | dBm | 15   | Fax Transmit Level.            |
| S95 | Bit-Mapped       |     | 0  | Extended Results Codes.        |

**NOTE:** Bit values are defined as follows for S95:

- 0 = CONNECT CODE indicates DCE speed instead of DTE speed.
- 1 = Append ARQ (automatic repeat request) to verbose CONNECT XXXX result code if protocol is other than none.
- 2 = Enable CARRIER XXXX result code.
- 3 = Enable PROTOCOL XXXX result code.
- 5 = Enable COMPRESSION result code.

Bits 4, 6, and 7 are reserved.

## AT+MS Command (Modulation Select)

This extended-format command selects the modulation and, optionally, enables or disables automode, specifies the lowest and highest connection rates, selects m-Law or A-Law codec type, and enables or disables robbed bit signaling generation (server modem) or detection (client modem) using one to five subparameters. The command format is:

### 56K:

```
+MS=<mod>[,<automode>][,<min_rate>][,<max_rate>][,<x_law>][,<rb_signal>][,<Maxup_rate>]]]]]]<CR>
```

### 33.6:

```
+MS=<mod>[,<automode>][,<min_rate>][,<max_rate>]
```

### Notes:

1. For 14400 bps and lower speeds, the Nn command and S37 register can alternatively be used, in which case the +MS subparameters will be modified to reflect the Nn and S37=x settings. Use of the Nn and S37=x commands is not recommended but is provided for compatibility with existing communication software. (S37 is not updated by the +MS command.)
2. Subparameters not entered (enter a comma only or <CR> to skip the last subparameter) remain at their current values.

### Reporting Selected Options

The modem can send a string of information to the DTE consisting of selected options using the following command:

```
+MS?
```

The response is:

```
+MS: <mod>,<automode>,<min_rate>,<max_rate>,<x_law>,<rb_signaling>
```

For example:

+MS: 56,1,300,56000,0,0 [56Kbps default values]  
+MS: 11,1,300,33600,0,0 [33.6Kbps default values]  
+MS: 10,1,300,14400,0,0 [14.4Kbps default values]

### **Reporting Supported Options**

The modem can send a string of information to the DTE consisting of supported options using the following command:

+MS=?

The response is:

+MS: (list of supported <mod> values), (list of supported <automode> values), (list of supported <min\_rate> values), (list of supported <max\_rate> values), (list of supported <x\_law> values), (list of supported <rb\_signaling> values)

For example,

+MS: (0,1,2,3,9,10,11,56,64,69),(0,1),(300-33600),(300-56000),(0,1),(0,1)  
[56000]: maximum rate

+MS: (0,1,2,3,9,10,11,64,69),(0,1),(300-33600),(300-33600),(0,1),(0,1)  
[33600]: maximum rate

+MS: (0,1,2,3,9,10,64,69),(0,1),(300-14400),(300-14400),(0,1),(0,1)  
[14400]: maximum rate

### **Subparameter Definitions**

1. <mod> = A decimal number which specifies the preferred modulation (automode enabled) or the modulation (automode disabled) to use in originating or answering a connection. The options are:

| <b>&lt;mod&gt;</b> | <b>Modulation</b> | <b>Possible Rates (bps)*</b>  |
|--------------------|-------------------|---|
| 0                  | V.21              | 300   |
| 1                  | V.22              | 1200  |
| 2                  | V.22 bis          | 2400 or 1200  |
| 3                  | V.23              | 1200**  |
| 9                  | V.32              | 9600 or 4800  |
| 10                 | V.32 bis          | 14400, 12000, 9600, 7200, or 4800<br>(Default for RC144)  |
| 11                 | V.34              | 33600, 31200, 28800, 26400, 24000, 21600,<br>19200, 16800, 14400, 12000, 9600, 7200,<br>4800, or 2400 (Default for RC56/RC336/RC288)<br>[RC56/RC336/RC288 only] |
| 56                 | K56flex           | 56000, 54000, 52000, 50000, 48000, 46000, 44000,<br>42000, 40000, 38000, 36000, 34000, 32000 [RC56 only]  |
| 64                 | Bell 103          | 300   |
| 69                 | Bell 212          | 1200  |

**Notes:**

1. See optional <automode>, <min\_rate>, and <max\_rate> subparameters.
2. For V.23, originating modes transmit at 75 bps and receive at 1200 bps; answering modes transmit at 1200 bps and receive at 75 bps. The rate is always specified as 1200 bps.

The modem may also automatically switch to another modulation (automode), subject to the following constraints:

- a. The modem may not be able to automatically switch from the current modulation (specified by <mod>) to some other modulation. For example, there is no standard way to automode from Bell 103 to V.23.
  - b. The DTE may disable automode operation (see <automode> below).
  - c. The DTE may constrain the range of modulations available by specifying the lowest and highest rates (see <min\_rate> and <max\_rate> below).
3. <automode> is an optional numeric value which enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. The options are:

| <b>&lt;automode&gt;</b> | <b>Option Selected</b>                                       |
|-------------------------|--|
| 0                       | Automode disabled  |
| 1                       | Automode enabled using V.8 bis/V.8 or V.32 Annex A (Default) |

The default value is 1, which enables automode. Note, however, there are modulations for which there is no automatic negotiation, e.g., Bell 212 (<mod> = 69).

**For <automode> = 0 (automode disabled, i.e., fixed modulation):**

- a. If <max\_rate> is within the rates supported by the selected modulation, the selected rate is that specified by <max\_rate>. For example:

+MS=10,0,1200,4800,0,0,4800 selects V.32 bis 4800 bps fixed rate.

- b. If <max\_rate> is greater than the highest speed supported by the modulation specified by <mod>, the starting rate is the highest rate supported by the selected modulation. For example:

+MS=10,0,2400,50000,0,0,14400 selects V.32 bis 14400, 12000, 9600, 7200, or 4800 bps.

- c. To emulate issuance of the N0S37=x command sequence to select fixed mode operation, specify the <max\_rate> and <min\_rate> both to be the (same) requested speed, and <mod> to be the modulation for that speed. For example:

+MS=11,0,16800,16800,0,0,21600 selects V.34 16800 bps fixed mode (no comparable S37 command).

+MS=10,0,12000,12000,0,0,14400 selects V.32 bis 12000 bps fixed mode (same as N0S37=10).

**For <automode> = 1 (automode enabled, i.e., automatically selected speed and modulation):**

The modem connects at the highest possible rate in accordance with V.8 bis/V.8, or V.32 bis Annex A if V.8 bis/V.8 is not supported by the remote modem.

- a. If <max\_rate> is greater than the highest rate supported by the modulation specified by <mod>, the modem automodes down from the highest rate of the selected modulation. For example:

+MS=10,1,1200,24000,0,0,14400 selects automoding down from V.32 bis 14400 bps.

- b. To emulate issuance of the N1S37=x sequence command, specify the modulation and the rate to start automodging down from using <mod> and <max\_rate>, respectively. Set <min\_rate> to 300 to allow automodging all the way down to V.21 300 bps. For example:  
 +MS=11,1,300,16800,0,0,28800 selects automode starting at V.34 16800 bps (no comparable S37 command).  
 +MS=9,1,300,12000,0,0,12000 selects automode starting at V.32 bis 12000 bps (same as N1S37=10).
3. <min\_rate> is an optional number which specifies the lowest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 2400 specifies the lowest rate to be 2400 bps. The default is 300 for 300bps.
4. <max\_rate> is an optional number which specifies the highest rate at which the modem may establish a connection. The value is decimal coded, in units of bps, e.g., 14400 specifies the highest rate to be 14400 bps. The default is 28800 for 28800 bps.
5. <x\_law> **(56K only)** is an optional number which specifies the codec type. The options are ( $\mu$ -Law):  
 0 =  $\mu$ -Law  
 1 = A-Law
6. <rb\_signaling> **(56K only)** is an optional number which enables or disables robbed bit signaling generation in a server modem or enables or disables robbed bit signaling detection in a client modem. The options are:  
 0 = Robbed bit signaling generation (server modem ) or detection (client modem) disabled (default)  
 1 = Robbed bit signaling generation (server modem ) or detection (client modem) enabled

Note that ATZ will reset the <rb\_signaling> selection to 0 (disabled).

Result Codes:

OK Valid subparameter string  
 ERROR Otherwise.

7. <maxup\_rate> This is the maximum upload rate (default is 33600). **(56K only)**

## Result Codes

| <b>Result Code</b> | <b>Numeric Value</b> | <b>Description</b>  |
|--------------------|----------------------|---|
| OK                 | 0                    | Modem successfully executed a command line.   |
| CONNECT            | 1                    | Connection made at 300 bps.   |
| RING               | 2                    | Modem detected an incoming call.  |
| NO CARRIER         | 3                    | Modem lost or could not detect a remote carrier signal within the Register S7 time.         |
| ERROR              | 4                    | Modem found an error in the command line.   |
| CONNECT 1200       | 5                    | Modem established a connection at 1200bps.  |
| NO DIALTONE        | 6                    | Modem did not detect a dial tone within 5 seconds after going off-hook.                     |
| BUSY               | 7                    | Modem detected a busy signal.   |
| NO ANSWER          | 8                    | Five seconds of silence was not detected when using the @ command in the dial command line. |
| CONNECT 0600       | 9                    | Modem established a connection at 600 bps.  |
| CONNECT 2400       | 10                   | Modem established a connection at 2400 bps.   |
| CONNECT 4800       | 11                   | Modem established a connection at 4800 bps.   |
| CONNECT 9600       | 12                   | Connection made at 9600 bps.  |
| CONNECT 7200       | 13                   | Connected as data modem during an answer.   |

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| <b>Result Code</b>     | <b>Numeric Value</b> | <b>Description</b>   |
|------------------------|----------------------|--|
| CONNECT 12000          | 14                   | Connection made at 12000 bps.  |
| CONNECT 14400          | 15                   | Connection made at 14400 bps.  |
| CONNECT 19200          | 16                   | Connection made at 19200 bps.  |
| CONNECT 38400          | 17                   | Connection made at 38400 bps.  |
| CONNECT 57600          | 18                   | Connection made at 57600 bps.  |
| CONNECT 115200         | 19                   | Connection made at 115,200 bps.  |
| CONNECT 230400         | 20                   | Connection made at 230,400bps.   |
| CONNECT<br>75TX/1200RX | 22                   | Modem returns this result code when upon establishing a V.23 originate connection when the modem has been instructed to report the DTE speed to the DTE upon connecting. |
| CONNECT<br>1200RX/75RX | 23                   | Modem returns this result code when upon establishing a V.23 answer connection when the modem has been instructed to report the DTE speed to the DTE upon connecting.    |
| DELAYED                | 24                   | For X4; when a call fails to connect and the number dialed is 'delayed' due to country blacklisting requirements.  |
| BLACKLISTED            | 32                   | For X4; when a call fails to connect and the number dialed is considered 'blacklisted'.  |
| FAX                    | 33                   | A fax modem connection is established.   |

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| <b>Result Code</b> | <b>Numeric Value</b> | <b>Description</b>                       |
|--------------------|----------------------|--|
| DATA               | 35                   | A data modem connection is established.  |
| CARRIER 300        | 40                   | Carrier rate of 300 bps.                 |
| CARRIER 1200/75    | 44                   | V.23 backward channel has been detected. |
| CARRIER 75/1200    | 45                   | V.23 forward channel has been detected   |
| CARRIER 1200       | 46                   | Carrier rate of 1200 bps.                |
| CARRIER 2400       | 47                   | Carrier rate of 2400 bps.                |
| CARRIER 4800       | 48                   | Carrier rate of 4800 bps.                |
| CARRIER 7200       | 49                   | Carrier rate of 7200 bps.                |
| CARRIER 9600       | 50                   | Carrier rate of 9600 bps.                |
| CARRIER 12000      | 51                   | Carrier rate of 12000 bps.               |
| CARRIER 14400      | 52                   | Carrier rate of 14400 bps.               |
| CARRIER 16800      | 53                   | Carrier rate of 16800 bps.               |
| CARRIER 19200      | 54                   | Carrier rate of 19200 bps.               |
| CARRIER 21600      | 55                   | Carrier rate of 21600 bps.               |
| CARRIER 24000      | 56                   | Carrier rate of 24000 bps                |
| CARRIER 26400      | 57                   | Carrier rate of 26400 bps.               |

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| <b>Result Code</b>      | <b>Numeric Value</b> | <b>Description</b>   |
|-------------------------|----------------------|--|
| CARRIER 28800           | 58                   | Carrier rate of 28800 bps.   |
| CONNECT 16800           | 59                   | Connect speed of 16800 bps.  |
| CONNECT 21600           | 61                   | Connect speed of 21600 bps.  |
| CONNECT 24000           | 62                   | Connect speed of 24000 bps.  |
| CONNECT 26400           | 63                   | Connect speed of 26400 bps.  |
| CONNECT 28800           | 64                   | Carrier rate of 28800 bps.   |
| COMPRESSION:<br>CLASS 5 | 66                   | The modem has connected in MNP class 5 and COMPRESSION message reporting has been enabled.           |
| COMPRESSION:<br>V.42BIS | 67                   | The modem has connected in V.42bis and COMPRESSION message reporting has been enabled.               |
| COMPRESSION:<br>NONE    | 69                   | The modem has connected without data compression and COMPRESSION message reporting has been enabled. |
| PROTOCOL:<br>NONE*      | 70                   | Modem has connected without any form of error connection.  |
| PROTOCOL:<br>LAPM*      | 77                   | Modem has connected in the V.42 LAPM mode of error correction.                                       |
| CARRIER 31200           | 78                   | Carrier rate of 31200 bps.   |
| CARRIER 33600           | 79                   | Carrier rate of 33600 bps.   |

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| <b>Result Code</b> | <b>Numeric Value</b> | <b>Description</b>                                       |
|--------------------|----------------------|--|
| PROTOCOL:<br>ALT   | 80                   | Modem has connected in the MNP mode of error correction. |
| PROTOCOL:<br>ALT   | 81                   | Modem has connected in the MNP10 mode.                   |
| CONNECT 33600      | 84                   | Connect speed of 33600 bps.                              |
| CONNECT 31200      | 91                   | Connect speed of 31200 bps.                              |
| CARRIER 32000      | 150                  | Carrier speed of 32000bps.*                              |
| CARRIER 34000      | 151                  | Carrier speed of 34000bps.*                              |
| CARRIER 36000      | 152                  | Carrier speed of 36000bps.*                              |
| CARRIER 38000      | 153                  | Carrier speed of 38000bps.*                              |
| CARRIER 40000      | 154                  | Carrier speed of 40000bps.*                              |
| CARRIER 42000      | 155                  | Carrier speed of 42000bps.*                              |
| CARRIER 44000      | 156                  | Carrier speed of 44000bps.*                              |
| CARRIER 46000      | 157                  | Carrier speed of 46000bps.*                              |
| CARRIER 48000      | 158                  | Carrier speed of 48000bps.*                              |
| CARRIER 50000      | 159                  | Carrier speed of 50000bps.*                              |
| CARRIER 52000      | 160                  | Carrier speed of 52000bps.*                              |
| CARRIER 54000      | 161                  | Carrier speed of 54000bps.*                              |
| CARRIER 56000      | 162                  | Carrier speed of 56000bps.*                              |

**\*pertains to models supporting 56K only**

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| <b>Result Code</b> | <b>Numeric Value</b> | <b>Description</b>          |
|--------------------|----------------------|-----------------------------|
| CONNECT 32000      | 165                  | Connect speed of 32000bps.* |
| CONNECT 34000      | 166                  | Connect speed of 34000bps.* |
| CONNECT 36000      | 167                  | Connect speed of 36000bps.* |
| CONNECT 38000      | 168                  | Connect speed of 38000bps.* |
| CONNECT 40000      | 169                  | Connect speed of 40000bps.* |
| CONNECT 42000      | 170                  | Connect speed of 42000bps.* |
| CONNECT 44000      | 171                  | Connect speed of 44000bps.* |
| CONNECT 46000      | 172                  | Connect speed of 46000bps.* |
| CONNECT 48000      | 173                  | Connect speed of 48000bps.* |
| CONNECT 50000      | 174                  | Connect speed of 50000bps.* |
| CONNECT 52000      | 175                  | Connect speed of 52000bps.* |
| CONNECT 54000      | 176                  | Connect speed of 54000bps.* |
| CONNECT 56000      | 177                  | Connect speed of 56000bps.* |
| +FCERROR           |                      | +F4 Fax carrier error.      |

**\*pertains to models supporting 56K only**

## Appendix D: Servicing Your Product

If your product requires service, first contact the authorized dealer from whom you purchased the modem. If the dealer is unable to assist you, and you must contact Boca Research, Inc., please follow the instructions below.

Our electronic BBS is available 24 hours a day at (561) 241-1601 and will support data transmission speeds up to 33.6Kbps with settings of N, 8, 1. Once your modem is functional, the BBS may be helpful (especially during off hours) if you have a question about product settings, or if you wish to download special software or utilities.

If the Troubleshooting section did not resolve your problem, you may call our technical support staff for assistance. If you haven't referred to the Troubleshooting sections, do so now.

**NOTE: CALLING TECHNICAL SUPPORT WITHOUT COMPLETE AND ACCURATE INFORMATION CONCERNING YOUR PROBLEM MAY BE BOTH TIME-CONSUMING AND FRUSTRATING FOR YOU.**

1. When calling Boca Research Technical Support, have the following information available:

- Board name and part number
- Computer manufacturer
- Computer Model
- Peripherals in system
- Operating system and version

**If you suspect a problem with a specific program or software package, make note of the name, version or release number, and manufacturer of the software.**

2. Call our Technical Support Department between the hours of 8:00 a.m. and 6:30 p.m. EST Monday through Friday at (561) 241-8088. A technician will be available to discuss the problem(s) you are experiencing.

**If factory service is required, you will be given a Return Merchandise Authorization (RMA) number. Please place this number on the outside of the package when you return the item(s) for service and reference it on any correspondence included in the package. Boca Research, Inc. will return any product which is not accompanied by an RMA number.**

3. Refer to the Warranty Statement if the product is covered under the five-year Boca Research, Inc. Limited Warranty.
4. Certain parts will not be covered under the Boca Research, Inc. Limited Warranty. Dealer installed parts are warranted by the dealer. Parts which you have installed yourself are covered only by the supplier's warranties. In these cases, Boca Research, Inc. can identify which parts are defective, but will not replace such parts until specific written authorization is received from you. The cost of parts and labor involved in making such repairs will be billed to you C.O.D.
5. When sending the product to Boca Research, Inc. for repairs, please be sure to include:

- **the modem (*board or external case only*)**
- **your name**
- **your return street address (for UPS purposes)**
- **phone number**
- **the RMA number mentioned above**

Package the product securely in a container equivalent to the original packaging, and insure the package to protect against loss or damage during transit. Shipping charges must be prepaid; C.O.D. shipments will not be accepted. Please use the address below for all correspondence:

**Boca Research, Inc.**  
**RMA Department - RMA # \_\_\_\_\_**  
**6500 West Rogers Circle**  
**Boca Raton, FL 33487-2841**

**NOTE ON INTERNATIONAL SHIPMENTS:** Customer is responsible for all charges associated with shipping product directly to Boca Research's facility. This includes but is not limited to freight charges, customs charges, freight forwarding fees, storage fees, handling fees, documentation fees, duties, taxes, port charges, etc. Boca Research will NOT pay charges on freight which is not correctly routed directly to Boca Research's facility.

6. If the repairs performed on your modem were covered by the warranty, Boca Research, Inc. will return it prepaid via UPS.

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## Appendix E: Warranty Information

### Limited Warranty

Boca Research, Inc. (BRI) warrants to the original buyer of this BRI product that the hardware is free of defects in materials and workmanship for a period of five (5) years from the date of purchase from BRI or its authorized dealer. Should the product fail to be in good working order at any time during the five-year period, BRI, will at its option, repair or replace this product as described below. This warranty does not cover defects resulting from misuse, abuse, negligence, accident, repairs, or alterations made by either the customer or another party. Boca Research reserves full rights to determine whether a defective product falls into this category.

The entire risk as to the quality and performance of the product rests with the customer. Any written or oral information or advice given by Boca Research dealers, distributors, agents, or employees will in no way increase the scope of this warranty. This warranty applies only to the product described in this manual and not to any other value-added software which may be included.

All products will be serviced and returned via UPS-ground at no charge to customers. All customers are required to demonstrate proof of purchase when requesting a Return Merchandise Authorization (RMA). The period of service commences on the date of purchase. A copy of the sales slip must be included with the returned merchandise.

Products which require Limited Warranty service during the warranty period should be delivered to BRI at the address in the Appendix (Servicing Your Boca Product) with proof of purchase and the Return Merchandise Authorization (RMA) number provided by BRI Technical Support. Refer to the Appendix in your manual. Replacement parts or complete products will be furnished on an exchange basis only. Replaced parts and/or products become the property of BRI.

If the returned product is sent by mail, the purchaser agrees to prepay shipping charges, insure the product or assume the risk of loss or damage which may occur in transit, and to use a shipping container equivalent to the original packaging. ALL EXPRESS AND IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE FOR THE PRODUCT ARE LIMITED IN DURATION TO THE ABOVE FIVE-YEAR PERIOD.

**UNDER NO CIRCUMSTANCES (WHETHER BASED IN CONTRACT OR TORT) SHALL BOCA RESEARCH BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE, LOSS OF BUSINESS, OR OTHER FINANCIAL LOSS AS A RESULT OF THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR DISRUPTION OF ITS PRODUCTS.**

**Boca's products are manufactured from new and serviceable used parts tested to Boca Research's quality assurance standards. If the product proves to be defective, Boca Research will bear the costs of labor and materials for hardware replacement or repair during the above specified warranty period. Boca Research or its Authorized Service Providers shall have the option to replace any defective part(s) with new part(s) or, at the option of Boca Research, with serviceable used parts that are equivalent to new parts in performance. Boca Research shall also have the option to replace any defective product(s) with functionally equivalent product(s).**

Boca Research reserves the right to make periodic changes or enhancements to any Boca Research product without prior notification, but has no obligation to modify or update products once sold.

This warranty gives you specific legal rights, and you have other rights which may vary from state to state. This warranty is valid only in the United States.





**Manual Part No. 9392-3  
10/97-1**